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A KNOWLEDGE OF LIFE HISTORIES IMPORTANT.

There is perhaps nothing that has furthered the progress of modern medicine more than a knowledge of the life histories of the causal organisms of contagious diseases, as well as the higher parasites, and their obligatory hosts, and other carriers.

What gross ignorance prevailed at one time with regard to malaria, for instance, when it was considered that some miasmatic influence was the sole cause, medical men not being aware at the time that locations where "miasma" was presumed to exist furnished the breeding places for certain mosquitoes *(anopheles)* which, from an after-study of their life histories, were found to be obligatory hosts of the *Plasmodium malariae*, the protozoal parasite responsible for the disease, and that after feeding upon the blood of a malarial patient, were capable of transmitting the parasite to a healthy person. Malaria was, therefore, found to be possible of control, and in some cases of total eradication, either by destruction of the insect-hosts, the mosquitoes, or by preventing their coming in contact with infected and healthy subjects.

Or, in the case of yellow fever, that scourge of the tropics and of the southern section of our own country. All sorts of

ideas prevailed among physicians as to its cause and transmission until a study of the life history of the secondary host, the *Stegomyia calopus,* was undertaken and worked out to a final conclusion.

Previously, many carriers of the infection were suggested, such as *fomites,* or clothing and merchandise of different kinds in transit from one place to another, as well as people from the infected areas.

All of this ignorance led to shotgun-quarantines being imposed in many places, and the general stoppage of communication. However, the knowledge obtained from a study of the life history of the special mosquito solved the problem for all time; and by destruction of the insect-host of the virus, yellow fever has become a thing of the past in sections where it formerly was a dreaded human scourge.

We have also a very prominent illustration in the case of *Bovine piroplasmosis,* or so-called Texas fever, which played such havoc among the cattle stocks of the country until the protozoan causing the fever was discovered in the blood, and the life history of the *Margaropus annulatus,* or common cattle tick of North America, was worked out and found to be an obligatory host of the specific organism, the *Piroplasma bigeminum.* Like malaria and yellow fever, the destruction of the tick, or secondary host of the protozoan, means the total elimination of this infection from the United States, and the saving of millions of dollars to the cattle interests of the country; and all from a working knowledge of the life history of the cattle tick in its connection with this disease. And it should not be forgotten that the work done on the protozoan of Texas fever and the life history of its obligatory host, the tick, suggested the possibility of malaria and yellow fever being insect-borne diseases, and their eradication through the elimination of the insects which harbored their viruses during a part of their development.

We might allude, also, to the value of a working knowledge of the life histories of the higher forms of two-host parasites, such as the various tapes, which infest both man and the lower animals: and of others, also, which do not require two individuals, as hosts, in order to complete their development, such as the different nematode worms which are often so destructive to our farm animals.

A working knowledge, or the absence of it, along such lines may frequently mean the difference between success and failure

on the part of the veterinarian when called upon to deal with parasitism in animals, whether bacterial, or that higher up the scale of parasitic life.

By this we do not mean that the practicing veterinarian is called upon, nor has he the time, to work out life histories, such as we have alluded to; but for his own information and benefit, he ought to avail himself of the data obtained by those who are making a special study in this particular line of investigation, of which a great deal has already been published, as knowledge of this phase of the practice of veterinary medicine is decidedly important, and is becoming more and more so every day.

GREAT INCREASE IN LIVE STOCK THROUGH CONSERVATION AND ELIMINATION OF DISEASE.

The last year of the great war witnessed a combined effort on the part of those concerned in live stock production that brought forth unparalleled results in the matter of supplying the world need for meats and fats at a most critical time. It may be recalled how in 1917, especially after the entrance of the United States into the war, the American people were enjoined to save food in every way possible, while the American farmer was urged to increase the production of foodstuffs and food animals to the limit of his capacity. How well this was done may be judged from official figures recently published by the United States Department of Agriculture.

First there is the department's estimate of our live stock resources on January 1, 1919, the numbers of which are here shown in comparison with the corresponding figures for the preceding year:

	Jan. 1, 1919	Jan. 1, 1918	Increase
Horses	21,534,000	21,555,000	*21,000
Mules	4,925,000	4,873,000	52,000
Milk cows	23,467,000	23,310,000	157,000
Other cattle	44,399,000	44,112,000	287,000
Sheep	49,863,000	48,603,000	1,260,000
Swine	75,587,000	70,978,000	4,609,000

*Decrease.

Another way of showing the increased production is by means of the slaughter records compiled in the Bureau of Animal Industry. In these estimates, in which the animals slaughtered are reduced to a dressed-meat basis, it is shown that the total production of dressed meat, including lard of swine, during the calendar year

1918 was 20,129,820,000 pounds, as against 16,317,280,000 pounds for 1917. The increase in a single year, therefore, was 3,812,540,000 pounds or 23.4 per cent. This vitally important contribution to the world deficiency in meats and fats not only fully met all the export requirements but left a large surplus for the home consumption as well.

Such a stupendous result naturally was brought about by means of many and diversified agencies, ranging from the government through the state and county official workers down to the individual farmer. Never before has the value of coöperative work been so strongly evidenced. Certainly the result could not have been accomplished except through carefully organized teamwork all along the line.

Although eminently satisfactory, however, the good work must by no means be halted because of the coming of peace. In a recent review of the agricultural situation, the Secretary of Agriculture has advised maintaining the number of horses and mules without material increase; a normal increase in the number of dairy cows and beef cattle; a conservative policy with respect to increasing the number of swine until the relative shortage and high price of feeds is overcome; and an increase in sheep consistent with facilities for feeding and pasturage and the farmer's skill in handling them.

Attention may appropriately be called to the part played by the veterinary profession in this great food-production campaign. The veterinarian's work may not be of a spectacular nature, but it is of no little importance in respect both to the public health and to the health and well-being of the country's live stock. In the first place, about 67 per cent of all the animals slaughtered for food in the United States passes the federal inspection, which is supervised by the veterinary staff of the Bureau of Animal Industry in charge of that service. In addition, special details of inspectors have been stationed at the various army camps and naval stations throughout the country (over 100 places in all) to safeguard the health of the military and naval forces from contaminated meat and other food products. During the fiscal year 1918 more than 300,000,000 pounds of products were inspected in this work.

Turning now to the conservation of farm stock and the eradication of animal diseases, the enormously enhanced value of farm animals nowadays has made their conservation and health a matter of much greater concern to the owners than was formerly

the case. Hence the veterinary work connected with the control of animal diseases and the prevention of losses therefrom has become increasingly important.

The eradication of the cattle tick in the South has been pressed most vigorously and successfully during the last few years. It can now be safely predicted that this destructive pest will be entirely eliminated within a few years.

That most widely distributed menace to the live stock industry, tuberculosis, has recently been made a special object of attack by the Bureau of Animal Industry. Coöperative work with the state authorities, live stock associations, and individual owners on a practically nation-wide scale has accomplished most flattering results in the short time the work has been in progress. At last reports about 500 pure-bred and 1,100 grade herds have passed the requisite tests and become fully "accredited" as free from tuberculosis. There are 165 Bureau veterinarians engaged in this line of work alone, and the various coöperating states employ about an equal number.

The control of hog cholera is proceeding on a vast scale, and such animal plagues as influenza of horses, scabies of sheep and cattle, blackleg, anthrax, contagious abortion, dourine, hemorrhagic septicemia, plant poisoning and other causes which operate to reduce live stock production continue to call forth vigilance and prompt service on the part of the veterinary forces of the country. J. R. M.

Public auction sales of surplus army horses and mules conducted by the remount division up to March brought a total of $11,414,997 to the government for 96,548 animals. These sales were held at thirty-six camps, cantonments and stations throughout the United States, and the average price obtained was $118 an animal. A total of 53,142 horses was disposed of, divided as follows: cavalry and riding horses, 26,245; light artillery horses, 26,550, and heavy artillery horses, 337. The 43,406 mules sold were classed as follows: wheel mules, 11,260; lead mules, 26,213, and pack and riding mules, 5,933. Auction sales of army horses and mules will be continued until the entire surplus has been sold.

It is the intention of the Division of Veterinary Medicine, Iowa State College, at Ames, to hold a practitioners' course this year during the week beginning June 23.

INVESTIGATIONS TO DETERMINE THE CAUSE OF CERTAIN SHEEP DISEASES IN COLORADO.*

G. H. Glover, I E. Newsom, E. W. Alkire,
Fort Collins, Colorado.

(Concluded from Page 22)

Lot No. 21.

Consisting of 200 pregnant ewes in excellent condition of flesh. Been kept in Denver yards most of the winter. Shipped to Weskan, Kansas, on March 6, 1918, where they arrived the following day and were driven 15 miles to a ranch. By the 10th several were noticeably sick. They were visited on the 15th. They were quite fat and several had already lambed. Nine had died, four of which had been lost the night previously. Between 40 and 50 were noticeably sick. Some 15 were down and could not rise. The others were breathing audibly, were dull, with heads down, and were not eating. Some few had their heads turned to one side, as though there were cerebral disturbances. Two of the dead ones were examined, each carried two fetuses. Both showed a few subcutaneous hemorrhages and the lymph glands, particularly the prescapular, were much reddened and hemorrhagic. Mucous membrane of the trachea and bronchial tubes was injected. There were subpleural hemorrhages in the lung tissue, but no pneumonic areas. Subpleural hemorrhages were numerous under the costal and diaphragmatic pleura. Hemorrhages were very numerous under the epicardium, especially at the auriculo-ventricular groove. A few hemorrhages were noticeable under the capsule of the spleen. The liver showed reddened areas throughout its surface. The fourth stomach was extremely reddened throughout, as were also certain areas in the intestines. Lungs and heart from one of these animals were brought to the laboratory, where direct cultures were made from the heart blood, and a rabbit was inoculated intravenously with 1 c.c. of a suspension of the heart blood worked up in distilled water. A sheep was given 10 c.c. intravenously of the same material. The rabbit remained healthy. Nothing definite was obtained from the direct cultures.

* Presented at 55th Annual Meeting, A. V. M. A., Philadelphia, 1918.

The record of the sheep was as follows:
March 17, 1918—Temperature, 105.2. Not eating.
March 18, 1918—Temperature, 105.4. Had eaten a little.
March 19, 1918—Temperature, 106.2. Not eating.
March 20, 1918—Temperature, 104. Not eating.
March 21, 1918—Temperature, 103.8. Eating some.
March 22, 1918—Temperature, 104.2.
March 23, 1918—Temperature, 104.
March 24, 1918—Temperature, 104.4.
Sheep remained healthy.

LOT No. 24.

Consisting of 2,950 head near New Castle, Colorado. There had been a loss of something over 300 head at the time of our visit. Feed was plentiful and the ewes were in excellent condition. The weather had been rainy. History was that they would get down and lie in a comatose state for many days, followed by death. Some showed cerebral symptoms, but few died quickly. At least five were posted which showed practically no lesions whatever. Finally one was found that had died soon after showing symptoms. There was considerable tracheitis and bronchitis. A filling of the lower portion of the apical and cardiac lobes, a few subpleural hemorrhages and many subepicardial ones. Stomach and intestines appeared normal. No laboratory work was done on this outbreak. The animals were later sent to the range, with very little further loss, although they were not vaccinated.

LOT No. 25.

Consisting of 1,000 head near Brush. These ewes were shipped in October. During December, five were lost with pneumonia, after which there was no further loss until March. During March, some 60 head had died. These were visited by the State Veterinarian and the local veterinarian, who made a diagnosis of hemorrhagic septicemia and recommended vaccination. Vaccination was carried out on March 26. They were seen by us on April 3, at which time five had been lost since vaccination. The owner believed the band showed remarkable improvement.

LOT No. 26.

Consisting of 66 ewes and 32 young lambs in the vicinity of Monte Vista. The owner reported that two of the ewes and three of the lambs had been lost. One of the small lambs was

posted by the local veterinarian, who described the following lesions: Many of the lymph glands were swollen and red. There was considerable tracheitis, some pneumonia, subpleural hemorrhages, a few hemorrhages at the base of the heart, and some on the bladder. This place was visited by us on April 8, 1918, at which time it was quite noticeable that nearly all of the young lambs were showing signs of illness. There was a muco-purulent discharge from the eyes and nose, in some instances the eyes being glued together. The lambs acted somewhat depressed. No post-mortem was obtained at this time. All of the 32 lambs, which varied in age from two days to a month, were vaccinated with a vaccine furnished by one of the local veterinarians. This place was visited again on May 13, at which time the owner had lost eight of the vaccinated lambs and was losing several more that had been born since the previous visit. One was posted that had died the night before. There was noticed a hemorrhagic tracheitis and bronchitis, with pneumonic areas in the lower portion of the anterior lobes of the lungs. A few subepicardial hemorrhages were present. Practically all lymph glands examined were swollen, red and hemorrhagic. The lungs and heart of this lamb were brought to the laboratory for further examination.

On arrival at the laboratory a rabbit was given intravenously 1 c.c. of heart blood emulsion at 2 p. m. Cultures were made direct from the heart blood. By the following morning the rabbit was found dead, cultures from which showed the typical bipolar organisms. To determine the virulence of this latter culture on May 27 a rabbit was given 1 c.c. of the 24-hour bouillon culture. The rabbit was found dead in the cage the next morning. Smears and cultures showed the usual bipolar organism.

On May 30, a sheep was given 15 c.c. of a 24-hour bouillon culture of the former culture intravenously at 11:30 a. m. At 9 a. m. the following morning the sheep was found dead. Cultures made from the heart blood showed the typical bipolar organism. A rabbit was destroyed with 1 c.c. of the heart blood of this sheep in less than 24 hours. Cultures from the rabbit showing the same organism.

Post-mortem on this sheep revealed the following: There were many hemorrhages in the subcutaneous and intramuscular fasciæ. The precrural, submaxillary, prescapular, popliteal and superficial inguinal lymph glands were hemorrhagic. The mucous membrane of the larynx and trachea was filled with hemor-

rhages, varying from petechiæ to ecchymoses. There was 600 c.c. of straw-colored fluid in the pleural cavity. Subpleural hemorrhages along the intercostal arteries were numerous. The lungs were studded with hemorrhages. There were a few petechiæ on the left auricle. The spleen showed several subcapsular hemorrhages. Sublumbar lymph glands were hemorrhagic. Kidneys showed marked congestion, but no hemorrhages. The mucous membrane of the fourth stomach and the first few inches of the duodenum were hemorrhagic. The leaves of the abomasum were slightly reddened. Some areas of the small intestines showed enteritis. The vessels of the pia-mater were slightly injected.

LOT No. 27.

Consisting of some 1,000 ewes, nearly all of which had sucking lambs. They were visited by us on May 7, 1918, at which time the owner stated that he had lost over 100 ewes, after which the ewes stopped dying and the sucking lambs began. He did not know how many lambs he had lost, but thought there were a great many. At the time of our visit, there were two lambs dead in the pens and four down in a comatose state. One noticeable symptom was that the heads were turned back, giving the appearance of a cerebral disturbance. These four lambs were brought to the laboratory. One died on the evening of the 7th, with the following post-mortem: The lymph glands were swollen and hemorrhagic. Pericardium filled with fluid. There were petechial hemorrhages of the heart and lungs, and a marked inflammation of the trachea. Cultures were made from the heart blood and one rabbit was inoculated with 1 c.c. of the pericardial exudate, given intravenously. An experimental sheep was given 10 c.c. of the pericardial exudate intravenously. The inoculated sheep never showed signs of illness. The rabbit died during the night of the 9th. Cultures from the heart blood of the inoculated rabbit showed a small bipolar organism, but it was contaminated with another organism, so that it was finally lost. A second rabbit inoculated from the first remained healthy. The three lambs lived for varying periods of time, lying in a comatose state, one living for six days.

LOT No. 30.

Consisting of 1,100 ewes in the vicinity of Del Norte. There had been a loss of approximately 100 since March 1, 40 of which had died in the last 30 days. Owner had also lost about 75

lambs. There was one sick ewe and one recently dead lamb found for examination. The post on the ewe is recorded as follows: She was slaughtered for the examination. There were gelatinous exudates present over the sternum and side of the neck. A few subcutaneous hemorrhages of the petechial type. The prepectoral and submaxillary lymph glands were hemorrhagic. The lungs showed congestion of one lobe and numerous petechial spots. Pericardium showed the presence of considerable gelatinous exudate. There were numerous subepicardial hemorrhages. A considerable amount of straw-colored fluid was present in the abdomen. The omentum was gelatinous, while the peritoneum over the kidneys was hemorrhagic. There were some hemorrhages on the uterus. The lamb showed some congestion of the lungs, submaxillary lymph glands, kidneys and brain. The lungs and heart of the ewe were brought to the laboratory, where, on June 17, a rabbit was inoculated intravenously with 1 c.c. of lung emulsion and another with 1 c.c. of heart blood emulsion. The rabbit given the heart blood emulsion showed no signs of illness. The one inoculated with the lung substance was found dead on the 15th. Bipolar organisms were found in smears from the heart blood of this rabbit and also in the pure cultures obtained from it.

DISCUSSION.

It is seen from the above series of cases that a gram negative bipolar organism has been isolated from certain pregnant ewes in typical outbreaks of what has been variously termed preparturient eclampsia or preparturient paralysis.

It has been possible by using these cultures and by using lung and heart blood emulsions from the affected ewes to reproduce what appears to be a similar condition in healthy nonpregnant sheep from which the original organism has been isolated. This has been done not once but several times. In fact, so frequently as to give the assurance that these cultures can be depended upon in proper dosage to produce death in sheep of various ages. It is true that in some instances inoculation and cultural results have proven negative, but this does not seem to us surprising. A recent happening will illustrate our views in this matter. A rather severe outbreak of chicken cholera occurred in the vicinity of the Station. One hen was brought to the laboratory by the owners. Smears made from the blood from any part of the body showed the presence of large numbers of

bipolar organisms. The place was immediately visited and two sick chickens, a rooster and hen, were brought back. The rooster died within two hours of arrival at the Station. Smears made from the blood anywhere in the body showed large numbers of bipolar organisms. The hen survived until some time the next day, when she died. Being in need of some smears for class work, one of our assistants made 50 smears from this hen. After he had finished the work and had them well stained, he examined one of them to be sure that his work was satisfactory. Not a single organism could we find in any of the smears, although there is every reason to believe that the hen died from the same malady that was affecting the other two. The inference I draw from this is that under certain conditions the organisms may be readily demonstrated in the blood of sheep, whereas we may find a few hours later they have left the blood stream entirely, and it is quite possible in some instances cannot be discovered in any of the body tissues. This is the way, then, in which we account for our negative results. Possibly also our technique has not always been of the best, and as it is developed we may find more positive results. We, therefore, believe from our experience thus far that this bipolar organism has a rather definite relation to the cases in pregnant ewes as above outlined. It will be noted in the later cases described, particularly in Lots 26 and 27, that the disease appeared to begin in the old ewes and then spread to the suckling lambs. From these lambs, it has also been possible to isolate what appears to be a bipolar organism of the same species as that isolated from the ewes, and which on injection has not only killed rabbits, but sheep with typical symptoms of hemorrhagic septicemia.

ANIMALS DESTROYED BY INOCULATION FROM OUTBREAKS.

Lot No. 3. November 29, 1916. A guinea pig was inoculated intraperitoneally with heart blood of a dead sheep. A rabbit was inoculated from the pleural exudate of the same animal. Both died the night of November 30. Smears and culture from these experimental animals revealed a small bipolar organism.

Lot No. 10. Lung emulsion was introduced intraperitoneally into a rabbit. Inoculated October 23 and died October 27, 1917. Smears from the rabbit showed bipolar organisms. Rabbit inoculated intravenously with 2 c.c. lung emulsion November 7, found dead November 12. Smears showed bipolar organisms.

Lot No. 11. Rabbit inoculated with lung emulsion on November 10. Died night of November 12. Smears and cultures showed bipolar organisms.

Lot No. 13. Rabbit inoculated November 27 with lung emulsion. Died November 30. Smears showed small bipolar bacilli.

Lot No. 14. Rabbit inoculated with suspension of heart muscle November 27. Died December 2. Smears showed small bipolar organisms.

Lot No. 18. An emulsion was made from the heart blood and lung tissue in boiled water. One c.c. of this material was given intraperitoneally to a guinea pig. The same amount to a rabbit and 10 c.c. was given intravenously into a sheep on March 2, 1918. All three animals were dead by the next morning. Smears and cultures from all these animals showed typical bipolar organisms. The sheep showed the following on post-mortem examination:

Many subcutaneous hemorrhages, both prescapular lymph glands deeply reddened and hemorrhagic. Mucous membrane of the trachea and bronchial tubes was deeply reddened. A few subpleural hemorrhages in the lung tissue and many along either side of the spine in the intracostal space and also above the sternum. The heart near the auriculo-ventricular groove was studded with hemorrhages. The fourth stomach was deeply reddened throughout its mucous membrane, as was also the first few inches of the duodenum. The kidneys were congested. There were a few small hemorrhages on the outer surface of the bladder.

From the above sheep 2 c.c. of heart blood was given a rabbit intravenously March 3, 1918. Rabbit died March 8, 1918.

Lot No. 19. Emulsion of lung tissue and heart blood in boiled water administered intraperitoneally in 1 c.c. dosage to one guinea pig and one rabbit, and subcutaneously to one rabbit on March 2, 1918. Ten c.c. of the same material given intravenously to a sheep. The rabbit and guinea pig which were inoculated intraperitoneally were found dead the next day. The rabbit inoculated subcutaneously died the second day after inoculation. The record of the inoculated sheep is detailed under Lot 19, previously described.

Lot No. 26. May 15, 1918. Rabbit inoculated with 1 c.c. of heart blood emulsion at 2 p. m. Found dead the following morning.

Lot No. 27. May 8, 1918. Rabbit inoculated with 1 c.c. pericardial exudate intravenously. Found dead May 10, 1918.

Lot No 30. June 11, 1918. Rabbit inoculated intravenously with 1 c.c lung emulsion. Found dead June 15, 1918.

SUMMARY.

ANIMALS DESTROYED BY DIRECT INOCULATION FROM OUTBREAKS.

Lot No. and Source	Amount and Animal	Method of Administration and Time Till Death
3 Heart blood.....	1 c.c. Guinea pig.....	Intraperitoneal, 24 hrs.
3 Pleural exudate.....	1 c.c. Rabbit.....	Intraperitoneal, 24 hrs.
10 Lung emulsion.....	1 c.c. Rabbit.....	Intraperitoneal, 4 days.
10 Lung emulsion.....	2 c.c. Rabbit.....	Intravenous, 5 days.
11 Lung emulsion.....	1 c.c. Rabbit.....	Intraperitoneal, 2 days.
13 Lung emulsion.....	1 c.c. Rabbit.....	Intraperitoneal, 3 days.
14 Heart muscle.....	1 c.c. Rabbit.....	Subcutaneous, 5 days.
18 Heart blood and lung	1 c.c. Guinea pig.....	Intraperitoneal, 24 hrs.
18 Heart blood and lung	1 c.c. Rabbit.....	Intraperitoneal, 24 hrs.
18 Heart blood and lung	10 c.c. Sheep.....	Intravenous, 24 hrs.
19 Heart blood and lung	1 c.c. Guinea pig.....	Intraperitoneal, 24 hrs.
19 Heart blood and lung	1 c.c. Rabbit.....	Intraperitoneal, 24 hrs.
19 Heart blood and lung	1 c.c. Rabbit.....	Subcutaneous, 2 days.
19 Heart blood and lung	10 c.c. Sheep.....	Intravenous, 10 days.
26 Heart blood.....	1 c.c. Rabbit.....	Intravenous, 24 hrs.
27 Pericardial exudate..	1 c.c. Rabbit.....	Intravenous, 2 days.
30 Lung emulsion.....	1 c.c. Rabbit.....	Intravenous, 4 days.

Animals destroyed by direct inoculation: guinea pigs, 3; rabbits, 12; sheep, 2.

CULTURES OF *B. OVISEPTICUS* ISOLATED FROM OUTBREAKS.

Lot No. 3. Cultures made direct from the heart blood and pleural fluid of dead sheep on November 29, 1916. Cultures were made from the guinea pig and a rabbit inoculated November 29, 1916, and died the night of November 30.

Lot No. 10. Cultures made from rabbit inoculated November 7, 1917, and found dead November 12, 1917.

Lot No. 11. Cultures made from rabbit inoculated November 10, and died November 12. Cultures made from heart blood of sheep January 15, 1918.

Lot No. 18. Cultures from a rabbit, guinea pig and sheep inoculated March 2, found dead March 3, 1918. Also from a rabbit inoculated with 2 c.c. of heart blood from the above experimental sheep. Died March 8, 1918.

Lot No. 19. Cultures from two rabbits and one guinea pig. Inoculated March 2. Died March 3 and 4. All showed bipolar organisms. Labeled Colt Rabbit No. 1, Colt Rabbit No. 2, and Colt Guinea Pig.

Lot No. 26. Culture made direct from heart blood of lamb. Culture made from rabbit inoculated with heart blood of above lamb May 15, 1918, found dead May 16, 1918.

Lot No. 27. Culture made direct from heart blood May 5, 1918, and from rabbit inoculated May 8, 1918, and died May 10, 1918. Both cultures found later to be contaminated and never isolated.

Lot No. 30. Culture made from rabbit inoculated with lung emulsion June 11, 1918, and found dead June 15, 1918.

CULTURES OF *B. OVISEPTICUS* ISOLATED FROM OUTBREAKS.

Lot No. 3. Heart blood affected sheep.
Lot No. 3. Pleural exudate affected sheep.
Lot No. 10. Inoculated rabbit.
Lot No. 11. Inoculated rabbit.
Lot No. 11. Heart blood affected sheep.
Lot No. 18. Inoculated guinea pig.
Lot No. 18. Inoculated rabbit.
Lot No. 18. Inoculated sheep.
Lot No. 19. Inoculated guinea pig.
Lot No. 19. Inoculated rabbit.
Lot No. 26. Heart blood of lamb.
Lot No. 26. Inoculated rabbit. Contaminated.
Lot No. 27. Heart blood of sheep. Contaminated.
Lot No. 30. Inoculated rabbit.
Number of outbreaks from which cultures were isolated, 8.

EXPERIMENTS TO SHOW VIRULENCE OF CULTURES.

March 7, 1918. Source of culture: made from the heart blood of a rabbit that had been inoculated with lung and heart emulsion of a sheep in outbreak No. 18. The rabbit had died within 12 hours after inoculation. Culture known as Lee rabbit.

Two c.c. of bouillon culture which had been transferred under date of March 3, 1918, was given intravenously to a rabbit at 3:30 p. m. Also 1 c.c. from the same source to a guinea pig intracardially.

March 8, 1918, at 8 o'clock a. m., both guinea pig and rabbit were found dead. Cultures were obtained from both of these and labeled Lee culture rabbit No. 1 and Lee culture guinea pig No. 1.

March 8, 1918. Source of culture: heart blood of sheep that

had received 10 c.c. of an emulsion of lung and heart blood taken from a sheep in outbreak No. 18. Thirteen c.c. of a culture which had been transferred March 7, 1918, and grown at 37°C., was given intrajugularly at 9:30 a. m. to two lambs, weight about 60 pounds. At 3:30 p. m. one of the lambs was rather dull and showed a temperature of 104.2. No. 2 was much excited, running from side to side of the pen. There was some hemorrhage from the nose. Temperature, 104.4, at 5 p. m.

March 9, 1918. 8:30 a. m., No. 1, temperature 102.8; No. 2, temperature 105.2; No. 3, temperature 104.3. 9:00 a. m., No. 3, temperature 103.2. 12:00 m., No. 3, temperature 104.2. 4:00 p. m., No. 1, temperature, 104.2; No. 2, temperature 103.4; No. 3, temperature 106.4. Lamb No. 3 was inoculated intrajugularly with 30 c.c. of the bouillon culture.

March 10, 1918. 8:30 a. m., No. 1, temperature 103, no appetite, appears dull; No. 2, temperature 103.1, no appetite and appears dull; No. 3, temperature 101.8, very dull, no appetite, almost too weak to stand, muco-purulent discharge from both nostrils streaked with blood. 5:45 p. m., No. 1, temperature 106.3, not eating, dull; No. 2, temperature 104, not eating, dull; No. 3, temperature 103.8, not eating, lying down, refuses to eat, hemorrhages from nostrils.

March 11, 1918. 8:30 a. m., No. 1, temperature 102.4, dull and not eating; No. 2, temperature 103.8, dull, not eating; No. 3, temperature 103.1, dull, not eating, lies down continuously, can rise when assisted, but lies down again immediately, breathing labored. 1:45 p. m., No. 3 found dead in the pen with the following post-mortem examination: There were no subcutaneous hemorrhages. The post-pharyngeal, submaxillary and popliteal lymph glands were red, swollen and hemorrhagic. The prescapular glands were normal. The mucous membrane of the larynx and trachea was deeply reddened and hemorrhagic. The lungs show hemorrhagic areas along the lower border of the left apical and cardiac lobes. The lower half of these lobes was filled. There were numerous subpleural hemorrhages, especially along the spine, but many were also present under the costal pleura. There was a small amount of fibrinous exudate on the pleura. The heart showed numerous petechial hemorrhages in the vicinity of the auriculo-ventricular groove. The liver showed a considerable number of reddened areas under the capsule, apparently due to a hemorrhage. The spleen appeared normal. The kidneys were congested. The bladder showed many small hemorrhages

in its outer coat. The stomachs appeared normal, but the duodenum and at least two feet of the small intestine showed a deep reddening throughout the mucous coat. 4:45 p. m., No. 1, temperature 103.8, not eating; No. 2, temperature 104.1, not eating.

March 12, 1918. 8:30 a. m., No. 1, temperature 102.4, eating a little; No. 2, temperature 104.5, not eating.

March 13, 1918. 8:30 a. m., No. 1, temperature 105.3, eating, appears lively; No. 2, temperature 105.2, dull, not eating, at times holds head to one side and moves in a circle. 4:00 p. m., No. 1, temperature 104; No. 2, temperature 105.7.

March 14, 1918. 10:00 a. m., No. 1, temperature 102.6; No. 2, temperature, 104.6. 4:30 p. m., No. 1, temperature 104; No. 2, temperature 105.4.

March 15, 1918. 9:00 a. m., No. 1, temperature 103.5; No. 2, temperature 104.6.

March 16, 1918. 10:00 a. m., No. 1, temperature, 103; No. 2, temperature 104.6.

March 18, 1918. 9:00 a. m., No. 1, temperature 101.8; No. 2, temperature 102.8.

March 19, 1918. 9:00 a. m., No. 1, temperature 102.4; No. 2, temperature 105, dull, not eating.

March 20, 1918. No. 1, temperature 102.6; No. 2, temperature 106, dull.

March 21, 1918. 2:00 p. m., No. 1, temperature 102.4 (this animal survived and no further records are given). No. 2, dead. Post-mortem is as follows: There were numerous subcutaneous hemorrhages. The post-pharyngeal, prescapular and mediastinal lymph glands were hemorrhagic. The trachea and larynx were congested and hemorrhagic. The lungs showed numerous subpleural hemorrhages. The apical lobe of the right one showing some solidification. There were hemorrhages beneath the costal pleura. The heart showed numerous hemorrhages of the petechial type, especially along the auriculo-ventricular groove and some on the auricle. The gastric and mucous membrane were intensively reddened, but the intestinal mucous membrane was normal. The kidneys showed petechial hemorrhages. Spleen slightly enlarged. Liver somewhat enlarged and firm. Cultures made direct from the heart blood showed cocci and were discarded. A rabbit inoculated from the heart blood remained healthy.

March 13, 1918. 3:00 p. m., large healthy lamb having temperature 102.6 was given intravenously 30 c.c. of a bouillon culture which had been made from heart blood of sheep No. 3.

March 14, 1918. 10:00 a. m., animal showed a temperature of 105.6, associated with dyspnœa and hemorrhages from the rectum. 4:30, temperature 103.3.

March 15, 1918. Sheep found dead. Post-mortem is as follows: The animal had been dead only a short time. There were no subcutaneous hemorrhages. The lymph glands appeared normal. The larynx normal. Trachea showed hemorrhagic areas and it was filled with bloody froth. There were many subpleural hemorrhages of the petechial type. These were very numerous over both lung surfaces, but also occurred beneath the costal pleura. A few petechial hemorrhages over the auricle of the heart.

March 13, 1918. A rabbit was given 1 c.c. of the same culture which was used on the above sheep.

March 14, 1918. 10:00 a. m., rabbit dead. Bipolar organisms were recovered in pure culture from this rabbit.

March 16, 1918. One c.c. of a bouillon culture isolated from above rabbit and dated March 27, 1918, was inoculated intraperitoneally into a guinea pig.

April 17, 1918. Pig dead. Culture from heart blood revealed bipolar organisms in pure culture. One c.c. of this was inoculated April 18, 1918, intravenously into a rabbit. Rabbit dead following morning.

April 19, 1918. Pure culture of a bipolar organism was obtained from the heart blood of this rabbit and carried as Lee culture rabbit No. 3.

May 2, 1918. Four rabbits, averaging 550 grams in weight, were given the following amounts of a bouillon culture obtained from Lee culture rabbit No. 3: No. 1, ¼ c.c.; No. 2, 1/10 c.c.; No. 3, 1/50 c.c.; No. 4, 1/100 c.c. All injections were made in the posterior auricular vein except No. 4, where the vein was missed, and the injection given subcutaneously.

May 3, 1918. All four rabbits dead.

May 3, 1918. Four rabbits given intravenous injections of Lee culture rabbit No. 3 as follows: No. 1, 1/100 c.c.; No. 2, 1/500 c.c.; No. 3, 1/1000 c.c.; No. 4, 1/10,000 c.c. Injections made at 5:00 p. m.

May 4, 1918. 9. a. m., all four rabbits found dead.

May 7, 1918. Four rabbits given intravenously the following amount of a bouillon culture labeled Lee culture rabbits No. 3: No. 1, 1/10,000 c.c.; No. 2, 1/100,000 c.c.; No. 3, 1/1,000,000 c.c.; No. 4, 1/10,000,000 c.c.

May 18, 1918. 9:00 a. m., No. 1 and No. 2 dead in cage, No. 3 very dull, No. 4 slightly indisposed. 10:00 a. m., No. 3 dead and No. 4 quite sick. 3:00 p. m., No. 4 eating some. No. 4 remained well. From this experiment we judge that the minimum lethal dose for a rabbit of the size used was 1/1,000,000 of a c.c. of a bouillon culture.

May 7, 1918. Four yearling sheep were selected for this determination. Temperatures taken and given the following doses of same bouillon culture as used on sheep Lot No. 3: No. 1, temperature 103.6, given 1/10 c.c.; No. 2, temperature 104.2, given 1 c.c.; No. 3, temperature 103.8, given 5 c.c.; No. 4, temperature 104.8, given 10 c.c.

May 8, 1918. Found sheep in following condition: No. 1, temperature 106.7, lame and appears sick; No. 2, temperature 106.2, lame and appears sick; No. 3, temperature 107, appears bright and O. K.; No. 4, temperature 105.6, very sick and shows discharge from nose. Stands quietly with head down. It is strongly suspected that No 3 is immune, having previously received a dose of a less virulent culture.

May 9, 1918. Sheep all alive and up. Nos. 1, 2 and 4 lame, Nos. 1 and 2 in front quarters and No. 4 in hind quarters. No. 3 apparently O. K. Temperatures at 10:00 a. m. as follows: No. 1, 105; No. 2, 104.8; No. 3, 106.2; No. 4, 103.

May 11, 1918. 10:00 a. m., No. 4 showed considerable discharge from nose, Nos. 1 and 2 lying down and not eating, No. 4 not eating. No. 1, temperature 104; No. 2, temperature 104; No. 3, temperature 103.

May 13, 1918. 10:00 a. m., No. 1, temperature 104.2, discharge from nose, very rapid respiration, stiff and lame; No. 2, temperature 104.9, somewhat lame but otherwise appears about normal; No. 3, lively; No. 4, temperature 104.5, very weak and unable to rise, head held to one side, profuse discharge from nose, eyes closed.

May 14, 1918. Nos. 1 and 2 seem a little better, No. 3 still lively, No. 4 very sick, same symptoms as yesterday.

May 15, 1918. No. 1, temperature 104.9; No. 2, temperature 105.2, No. 4, temperature 106, discharge from nose.

May 16, 1918. No. 1, temperature 104; No. 2, temperature 105; No. 3, O. K.; No. 4, dead. Post-mortem shows pneumonia, petechial hemorrhages on heart. Stomach and duodenum were congested. Lymph glands very hemorrhagic. Numerous hemorrhages in subcutaneous tissue. Spleen and liver normal. Showed

hemorrhages from rectum. Had profuse discharge from nose four days before death. Cultures made from heart blood.

May 17, 1918. Cultures made from heart blood of No. 4 shows a very mixed infection. Large numbers of different cultures being present in cultures. No. 1, temperature 104; No. 2, temperature 105, very lame; No. 3, lively, O. K.

May 18, 1918. No. 1, temperature 103.9, eating; No. 2, temperature 104.1, same as yesterday; No. 3, lively and O. K.

May 20, 1918. No. 1, eating a little; No. 2, not eating, very lame; No. 3, lively and O. K.

May 28, 1918. No. 1, eating and O. K. but somewhat lame; No. 2, seems to be O. K.; No. 3, O. K.

June 24, 1918. No. 2 always remained thin and carries left hind leg. No. 1 still lame in right front leg, knee seems enlarged.

SHEEP NO. 4, LOT NO. 2.

May 30, 1918. Sheep given intravenous injection of 15 c.c. of 24 hour bouillon culture of Monte Vista culture at 11:30 a. m.

May 31, 1918. Sheep found dead in pen at 9:00 a. m. Had evidently been dead some time. Cultures made and rabbit given intravenous injections of 1 c.c. heart blood emulsion.

June 1, 1918. Rabbit found dead. Smears from heart blood show large numbers of bipolar organisms. Cultures made and labeled Monte Vista No. 2.

POST-MORTEM ON EXPERIMENTAL SHEEP NO. 4.

May 31, 1918. Subcutaneous hemorrhages. Precural, submaxillary, prescapular lymph glands extensively reddened and hemorrhagic. Outer muscular fasciæ, especially in region of shoulder and neck, studded with large hemorrhages. Popliteal lymph glands; one normal and one hemorrhagic. Superficial inguinal hemorrhagic. Larynx and trachea covered with extravasations varying from petechiæ to ecchymoses, hemorrhages. Straw-colored fluid pleural cavity 300 c.c. one side L., 300 c.c. on right side.

Subpleural hemorrhages along intercostal arteries. Lungs studded with petechial hemorrhages. Diaphragm normal. Spleen shows several subcapsular hemorrhages of ecchymotic type. Sublumbar lymph glands slightly hemorrhagic. Bladder empty. Slightly reddened mucous membrane. Liver, several subcapsular hemorrhages, particularly on cardiac lobe. Small amount of fluid in peritoneal cavity.

Fibrinous adhesions of apical and cardiac lobes to costal pleura. Few petechiæ on left auricle. Subcutaneous extravasations of blood throughout trachea. Mucous membrane of fourth stomach deeply reddened throughout. First few inches of duodenum reddened and hemorrhagic. Leaves of abomasum slightly reddened. Mesenteric lymph glands normal. Some areas of small intestine show enteritis. Vessels of pia-mater highly injected.

LOT NO. 3, SHEEP NO. 5.

June 6, 1918. One sheep given 15 c.c. Colt Rabbit No. 2 culture (bouillon) at 11:30 a. m. Temperature at time of injection 104.8. 2:00 p. m., temperature 106, respiration rapid, down. 5:00 p. m., still down, sluggish and somewhat bloated, temperature 104.

June 7, 1918. 9:00 a. m. Found dead, cold, evidently died early in night.

Post-mortem: Frothy discharge at nostrils. No subcutaneous hemorrhages. Precrural lymph glands normal. Submaxillary and prescapular lymph glands deeply reddened and hemorrhagic. Few subpleural hemorrhages in lower thorax on one side and large number on other side. Some fluid in thoracic cavity. Thymus hemorrhagic. Heart extremely hemorrhagic. Trachea and bronchi show extreme diffuse hemorrhages throughout. Liver reddened with hemorrhages, particularly at upper (Lot. 3, Sheep 5) Notebook. Ecchymotic subserous hemorrhages in small intestines. Kidney extremely ecchymotic. Sublumbar lymph glands hemorrhagic. Subcapsular hemorrhages on spleen. Fourth stomach normal. Few hemorrhages in mucous membrane. Hemorrhages in connective tissue around trachea. Larynx hemorrhagic. Rabbit injected with 1 c.c. of blood from axillary A at 9:30 a. m. Cultures made and labeled Colt culture Sheep No. 1. Cultures from heart blood.

VIRULENCE OF CULTURES.

GUINEA PIGS.

Source	Pig No.	Amount Used	Method of Entrance	Time Till Death
Lot 18	1	1 c.c.	Intracardial	18 hours
Rabbit No. 2	2	1 c.c.	Intraperitoneal	24 hours

RABBITS.

Source	Rabbit No.	Amount Used	Method of Entrance	Time Till Death
Lot 18	1	2 c.c.	Intravenous	18 hours
Sheep No. 3	2	1 c.c.	Intravenous	24 hours
Pig No. 2	3	1 c.c.	Intravenous	24 hours
Rabbit No. 3	4	1/4 c.c.	Intravenous	24 hours
Rabbit No. 3	5	1/10 c.c.	Intravenous	24 hours
Rabbit No. 3	6	1/50 c.c.	Intravenous	24 hours
Rabbit No. 3	7	1/100 c.c.	Subcutaneous	24 hours
Rabbit No. 3	8	1/100 c.c.	Intravenous	24 hours
Rabbit No. 3	9	1/500 c.c.	Intravenous	24 hours
Rabbit No. 3	10	1/1,000 c.c.	Intravenous	24 hours
Rabbit No. 3	11	1/10,000 c.c.	Intravenous	24 hours
Rabbit No. 3	12	1/10,000 c.c.	Intravenous	24 hours
Rabbit No. 3	13	1/100,000 c.c.	Intravenous	24 hours
Rabbit No. 3	14	1/1,000,000 c.c.	Intravenous	24 hours
Rabbit No. 3	15	1/10,000,000 c.c.	Intravenous	Lived
Lot 26	16	1 c.c.	Intravenous	24 hours
Lot 19	17	1 c.c.	Intravenous	24 hours
Lot 19	18	1 c.c.	Intravenous	24 hours
Lot 26	19	1 c.c.	Intravenous	24 hours

SHEEP.

Source	Sheep No.	Amount Used	Method of Entrance	Time Till Death
Lot 18	1	13 c.c.	Intravenous	Lived
Lot 18	2	13 c.c.	Intravenous	13 days
Lot 18	3	30 c.c.	Intravenous	2 days
Sheep No. 3	4	30 c.c.	Intravenous	2 days
Lot 19	5	1/10 c.c.	Intravenous	Lived
Lot 19	6	1 c.c.	Intravenous	Lived
Lot 19	7	5 c.c.	Intravenous	Lived
Lot 19	8	10 c.c.	Intravenous	9 days
Lot 19	9	15 c.c.	Intravenous	12 hours
Lot 26	10	15 c.c.	Intravenous	24 hours
Rabbit No. 3	11	5 c.c.	Intravenous	24 hours
Rabbit No. 3	12	5 c.c.	Intravenous	12 days
Rabbit No. 3	13	5 c.c.	Intravenous	Lived
Rabbit No. 3	14	10 c.c.	Intravenous	24 hours
Rabbit No. 3	15	1 c.c.	Intravenous	11 days
Rabbit No. 3	16	5 c.c.	Intravenous	6 days

Guinea pigs, 2; rabbits, 18; sheep, 11.

4:44 p. m. Rabbit found dead in cage. Cultures made and labeled Colt Rabbit No. 3.

May 27, 1918. Source of culture, Rabbit No. 3. Rabbit given 1 c.c. of 24 hour bouillon culture. Found dead next morning.

Source of culture, Lot 26. Rabbit given 1 c.c. of 24 hour bouillon culture. Dead the next morning.

May 28, 1918. Source of culture, Outbreak 19. Rabbit given 1 c.c. of 24 hour bouillon culture. Found dead next morning.

VACCINATION.

Since our early findings several thousand sheep have been vaccinated within the State. We give here merely a record of those vaccinated either directly under our supervision or following our visit to the premises. Altogether, we have to record 13,481 vaccinations, 505 of which were sick at the time and 550 of which had been lost. The records following vaccination show a loss of 131. This from a lot of fourteen different bands. While these records appear to be satisfactory, yet there is still a question in our minds as to the real value of this procedure, as we also have records of a number of bands that were not vaccinated and yet the disease stopped. In other instances, however, where vaccination was refused, the disease progressed and took a large per-

centage of the animals. We are carrying on some experiments now to determine the actual value of vaccination under experimental conditions. In some instances it appears to be necessary to repeat the vaccination, especially where the losses have not stopped within a week following the first administration.

RECORD OF VACCINATION.

Date	Number Vaccinated	Number Sick at Time	Number Died Previously	Number Died After
November 10, 1917	504	40	50	4
November 13, 1917	771	20	20	2
November 30-December 8, 1917	4,500	10	49	4
December 21, 1918	1,100	200	40	22
March 5, 1918	1,301	6	46	35
March 24, 1918 (revaccinated)	287	...	...	...
March 5, 1918	425	7	40	18
March 19, 1918 (revaccinated)	235	4	...	4
March 5, 1918	486	4	16	2
March 26, 1918	1,000	75	70	5
March 27, 1918	525	23	12	2
April 5, 1918	652	100	*	25
May 22, 1918	45	2	2	1
May 23, 1918	100	4	25	1
June 8, 1918	900	8	170	5
June 10, 1918	650	2	10	1
Total	13,481	505	550	131

* Several.

DISCUSSION ON DR. NEWSOM'S PAPER.

DR. SIMS: I believe we have had all the conditions Dr. Newsom described there, in the extreme northwest. We have found a bipolar organism in a few cases—not quite so often as he has. Where the vaccine was not within reach we have changed conditions by changing the feeding ground and watering. It would take five days to get the vaccine to them, and we would advise them to change the feeding places and watering places; and in a good many instances the trouble has disappeared before the vaccine was injected.

Most of our veterinarians, I believe, agree that it was due to lack of exercise, and to overfeeding; and through exercising we have controlled this trouble in most instances, driving the sheep from one to three miles each day. And the reports are that it has controlled in the majority of these outbreaks, although in a few

cases it did not. We found it was the fattest that died in most instances.

Perhaps our trouble with pregnant ewes is somewhat different from what Dr. Newsom finds, because he says he has had lambs die from the same outbreak. Our veterinarians appreciate very much Dr. Newsom's work. It has been a great help within the last three years.

THE TREND OF VETERINARY EDUCATION.*

W. HORACE HOSKINS, New York, N. Y.

Reciprocity is needed and becomes more so every year and we can find a solution for it; there is no question about that in my mind.

It must be for better government and through the civil service commission of our government and this association joining with the Department of Agriculture and the army, which shall constitute a board who shall prepare suitable questions and a form of examination to determine the qualifications of members of the profession and when they pass this examination under the auspices of this association they will give them a certificate showing they have passed the examination. The examination, I hope, shall admit any member of the profession to the federal services; with the exception of the additional examination required for entrance into the army veterinary service or any other civil positions that come within the province of the veterinarian in any other department of our government.

It will give them a status that will never be obtained in any other way, and then we can go into the state legislatures and ask them to accept this certificate in lieu of an examination. That is perfectly plausible and can be carried out and I am hoping that I may live long enough to take that matter up with Congress in Washington, and all it will require is an additional appropriation for the civil service commission to carry it out. We have no standard of recognition in Europe and here we have just as many standards as there are state boards and just as many standards as colleges. We have large private colleges and state colleges, and so without any further remarks I feel this can be carried out and is the only solution of the reciprocity that will ever solve the difficulty.

*Presented at Section of Veterinary Faculties and Examining Boards, 55th Annual Meeting, A. V. M. A., Philadelphia, 1918.

The state board standards are constantly changing. A few years ago in one of the states there was a complete political upheaval. Five men were swept out because they were not of the same political affiliation, five other men were placed on the board because of their political faith, the same faith as the party that had come into power. Thus were installed five men who had been educated twenty-five years ago and they were asking questions from text-books of twenty-five years ago and the graduates all failed simply because they were asking questions these young men did not know anything about, and they will repeat this constantly until we have the power in another way by submitting or modifying our legislative act, by submitting to the state government a number of names.

We have had a governor say that it is the prerogative of the governor and he is capable of selecting his own candidates.

The trend of state colleges for some time has not been fruitful with the best possible results and the continued actions of the parent association under which we live and exist has not always been conducive to the very best results. There has been the constant trend of the American Veterinary Medical Association to drive out of existence the private schools. Still there were some things to be gained by driving some private schools out of existence, while with others there were likely to be great losses incident to attempting to do so. In the history of veterinary education in this country the story of private schools shows a wonderful work. So long as the veterinarian is not supported by the federal government we must realize that veterinary education is a state problem. If states will not support us then we must have private schools and we ought not to be unmindful in this connection of the fact that for more than thirty years seventy per cent of the members of this association have been graduates of private schools. We have had good private schools and some poor ones, because state schools are always dependent upon the liberality of the state administration in furnishing funds for their maintenance. One of the great trends of state institutions is that invariably they are located in small inland towns and associated with an agricultural school in some isolated community. We have good schools but no great schools in inland towns, and it will take thirty or forty years to attain same for the very reason that the teaching staff must be given adequate salary such as would be a living salary for their maintenance from year to year. No state has been generous enough to give liberal

salaries sufficient to make our state schools as strong as they ought to be, and when the veterinary association required there should be five veterinarians on the teaching staff, some of the schools were compelled to take two or three men with nominal pay and nominal connection and add them to their faculty, while one or two were paid full salaries. The great problems are not all in the agricultural districts and the great schools are destined to be those so located that they can command part of the time of a large number of men who are specialists by virtue of years of experience, years of training and years of observation. If you are going to get them in the inland towns you must pay them larger salaries than any state has been willing to give for the teaching staff and when you take them into the inland towns you take them away from the everyday problems and thereby lessen their value as teachers. In large cities it is possible to get a large number of men for a comparatively small total amount. You cannot use more than twenty or twenty-five men on your teaching staff because you cannot give them more than one or two hours and I would rather have men teaching that are in everyday contact with the problems to solve in practice than the men in small inland towns forced to spend their time in laboratories or libraries. It is possible to get these men in the city school. In New York we have such assistants and they are contributing part of their services, and a school of that kind can be maintained for less than in the inland town, where the majority of the teaching staff must be given adequate salaries to keep them the entire year. The larger problem is the animal food problem and the relation of animal diseases to man; also the great problem of feeding large masses of people in great metropolitan districts. We must be able to feed and clothe the people in metropolitan districts or we have not solved their problems properly.

The relation of animal diseases to man is seen more in the large cities than in the inland towns. The trend of state schools has been to get away from the old apprenticeship system and the best system will link the apprenticeship with the necessary laboratory instruction before they will turn out a fully rounded veterinarian.

The increased requirements of high school education have not been all that has been talked about and is not today furnishing us the best class of students. The boys who come out after four years of high school work, of 18 or 19 years of age, have no

knowledge of animal industry, animal husbandry, and no knowledge of normal animal life, and therefore they are far less fitted than those referred to in another address of the president's—those who come from the forge and from the farm—had a valuable equipment when they came.

The state schools cannot keep up the old apprenticeship system. The trend of the state schools is to give a man one line of instruction and one man's conception of the subject. I would rather have veterinary students get three or four men's points of view because I am sure it will develop a thinking man and not one with an ego tendency thinking that the way they have been taught is the only way. Legislatures have not realized what veterinary medicine means. The public has no idea of our intimate relation with mankind extending from infancy to old age; until the public gets the conception that the food they eat, whether it be meat, or milk; the shoes they wear, or the wool in clothing is dependent upon veterinary education—not until we get the public to see that vision will we get these state colleges properly supported. I believe the large cities offer the best opportunities for conducting great veterinary schools.

Another factor of state schools—they are never accompanied by that same loyalty you will find in men of the old private schools. Men very often went back to private schools for post-graduate work. Their sons went there also with that feeling of loyalty and devotion that you cannot get by simply paying salaries. The trend is for state schools to offer a man $500 more, or, as seen in Dakota, a man was taken down in Nebraska to do experimental work by the offer of more salary. This is particularly true of state schools in inland towns. Private schools are due to exist in the large cities for years to come through the loyalty and devotion of men connected with the schools both as their trustees and teaching bodies.

DISCUSSION.

CAPTAIN F. C. WAITE: I ask for information. In Dr. Hoskins' introduction it might not be known to all of you that this same question of reciprocity on the Federal Examining Board has been before the medical profession for many years, and they have finally found a half-way solution which seems, at least to me, to be found in a national examining board. It does not have certificates because certificates have no value except when an examining board chooses to accept them. The laws of many of

the states at the present time prohibit that and specify a man can get a license to practice medicine after taking an examination; other states are already accepting these certificates and issuing licenses upon them. Gradually the states are coming in so that this privilege is being extended. The army, navy and public health service accept those certificates. The board is made up of representatives of the medical profession from representatives of the government of the different bureaus. At present it is supported financially by grant extending over a term of years. The examining board is giving examinations four times per year, at each examination an additional number coming up to be recognized as the standard—high standard of the country—if a man has a certificate from the national examining board, not a federal board, a private thing made up from civil life and government.

DR. GLENNON: Mr. Chairman, in reply to Dr. Hoskins, it being up to the governor as to whom he would select, that was true even in our state until the last session of the legislature. Now the governor has the appointment of one member out of three that are recommended to him by the Veterinary Medical Association of New Jersey. I think that is a step in the right direction.

DR. ROGERS: I had the privilege of being for ten years a member of the New Jersey State Board. We had, I think, a very good board and we did very good work. There was one peculiarity about it as far as my inquiry goes—we had an inordinate number—in other words, we felt it to be our duty to be always looking for an opportunity to let the chap go through. If you are ever going to get the best values you must fix it in such fashion that when a man goes up for a license to practice, to pass that examination they have a standard, and a proper standard, and if he does not pass it there must be no kick coming. As now constituted the principal function of the state board is to O. K. him.

DR. E. L. QUITMAN: I want to express my sentiments as coinciding with every word stated by Dr. Hoskins, and in view of the possibilities or the great trend growing in the veterinary profession and furthermore the possible dearth within the next year or two, I think his remarks should be given serious consideration by members of the state colleges, by the American Veterinary Medical Association, by the Bureau of Animal Industry, and last, but by no means least, the army. I am quite sure that

nearly every member of the state colleges feels in his heart that Dr. Hoskins spoke the truth. They may not admit it, but they cannot help but see and know that it is a correct picture of conditions. In my opinion, too radical a change is going to bring about such a dearth of veterinarians that the country will in a couple of years be overrun with quacks, and instead of being a step in advance may be many steps in the retrograde direction. There is such a thing as eating more than one can digest and biting off more than one can chew, and I am very much afraid we are confronting such a condition at the present time.

DR. C. H. STANGE: I represent one state college. I got the impression from Dr. Hoskins that private institutions did more and better training than the state does by spending three or four times the same amount of money in giving a man a professional education. I cannot see how that can be done. If the public cannot furnish more money for better education than the standard of the present time at the private veterinary or medical college, with food to pay for, I am very much mistaken. I want to tell the men who are assembled here that a medical education, either in human or veterinary profession, is one of the most expensive educations anybody can get at the present time, not only on account of the faculties that must be maintained but on account of the equipment necessary. Also I want to call your attention to the fact that especially since the motor trucks have come into the large cities a very large percentage of the graduates of veterinary colleges, either private or state, are practicing in rural communities. The big problems are not in the cities but in the communities where the food animals are being produced. It is during the process of production and getting ready for market that the infectious diseases are found. In our state we lost 28,000,000 swine in one year from infectious diseases and still the author of the paper would have you believe the problems are much greater in the cities. There is, in my mind, no comparison. You are going to talk about sanitation and preventive medicine—I want to invite the author or speakers to come to the studied conditions of facts. Because, as I get it, if I am correct in my deduction from his speech, he does not understand the condition we are in for the whole community where a large part of these food products come.

As far as educating men at a state college in small cities, I believe we can educate veterinarians for these rural provinces to handle the question—aside from preventing disease among

live stock—to more advantage when we have them under those conditions than in any city in which I have been. In a great many of the state institutions at the present time men are required to go out and do practical work before they graduate. The objection to a state college was raised that the students and faculty do not get city practice. I want to say the big problems in disease controlled work in this country are in the agricultural districts and we can train them better in those districts than any big city.

DR. GLENNON: I have given this problem thought from an active country practice. In my judgment, the gentleman who just sat down has made quite a common mistake. The arguments advanced cannot be refuted but the premises he assumes are in a large degree incorrect. When I send my boy to get a veterinary education what do I want for that boy? I want his education to be well rounded. I want him to be equally familiar with the pathology and therapeutics of all animals. I want him to do what I have been able to do, to do my own surgery, to do my own pathological work. I want him to be familiar with the conformation of the horse, I want him to be familiar with cattle. There is no use denying the opportunities of acquiring the knowledge of cattle and the practice among swine is better acquired in the agricultural districts than in large cities, but when it comes to running horse practice, draft horse practice, opportunities in cities are better. Furthermore, city schools can be conducted at less expense than country schools. Comparative anatomy, physiology, pathology, practical botany—those things are, for example in the city of New York, largely taught by men who have made those subjects specialties, and who may attract students from many sections; for example, in New York schools students get their surgery from a medical college and a good deal of physiology from the medical school and from men who are thoroughly conversant with it and thoroughly well prepared to teach. I feel myself the present tendency to make the veterinary school the agricultural crutch is not the purpose for which we send our boys to school. We want our veterinarians to be more practical. Take the tendency to teach therapeutics—you cannot teach therapeutics that way—that is, as far as the boy gets and while I am very glad to go to him I would rather take the opinion on the question of therapeutics from a man like those who are practicing in a large city than I would from any pharmacologist who ever went down the pike.

I think it would be better for city and country to get together—let the city schools send the boys to the country for one year and the country boys be sent for one year to the city schools.

DR. WILLIAMS: I was unfortunate in not reaching the room until near the close of Dr. Hoskins' address. I gathered from some of his last remarks that he believed there was greater loyalty in private than in state schools. I did not understand what kind of loyalty this was—loyalty to schools or to the profession. I do not think we should criticise anybody's loyalty without very good grounds. So far as I know, the men in the private schools have been loyal to their colleges. I have been a member of the faculty of a state college for twenty-two years. Every man who was on that faculty twenty-two years ago is a member of the faculty as it stands today. Every man is loyal to the school—they are just as loyal to the profession as any member of any faculty in any college. In Dr. Stange's remarks he stated we were changing very greatly the methods of scientific education. It is not our veterinary profession alone, but the change has overtaken all scientific education. When I graduated in 1879 veterinary education was given in the lecture room—that is out of date now. Any veterinary or medical school that attempts to teach any of these sciences, wholly or chiefly, in the school room is a dead institution. Today scientific education is conducted in the laboratory. That is the difference in veterinary education now and forty years ago.

Dr. Rogers has stated there are certain advantages in the city over the country. Granted. There are more cats in the city with intestinal difficulty on account of swallowing hair than there are sick cattle. We have a great many cats and dogs in our clinic and some of them come back very frequently. Some dogs as soon as they are liberated from the hospital go out and get into another fight and come back. As Dr. Stange says, the most pressing problems are among the meat and milk producing animals and the infectious diseases found among them. There can be no question about that. As a matter of fact, sixty per cent of the veterinary practice in the state of New York is with dairy cattle, and ninety per cent of the cattle practice is with the genital organs.

Dr. Rogers mentioned one very important truth, more important at one time than now, when he expressed the wish that students might pass part of their time in a city and part in a country college. In the college with which I am connected there

are thousands of dollars expended annually in order to give students actual clinical observation and experience. The only way to properly instruct students is to have adequate clinical instruction in connection with the college. It is an old idea, now done away with, that the college should give the didactic teaching and leave the practical teaching to a nondescript faculty which is not in control of the college. That is, the student during his vacation shall go out into the country and practice with a veterinarian and there get his clinical observation and teaching. I have seen some of that. I am not finding fault with the underlying principle. The point is this—whenever an institution sends students out to veterinary practitioners to get their clinical education they have no control over the character of the teaching by the practitioner, and the school is at the mercy of those practitioners. It seems to me it is the duty of the college to furnish that education to the student and not leave it to someone else.

DR. QUITMAN: A few like Dr. Williams should realize a school in the country is a country school, but a school located in a city, whether state or private, is both a city and a country school. Dr. Williams has truly said that at least sixty per cent of the practice of today is dairy practice. Cattle raised entirely for meat production are taking the time and attention of the country veterinarian in many parts of this country where in our parts it is the dairy cattle that are given attention. I think it is a matter to be easily understood in making the statement that a city school has advantages of both city and country. You take any city like Philadelphia, New York, Detroit, Chicago, Milwaukee, Minneapolis, any of the cities of any size, and they are immediately surrounded by great dairy farms and in some cases have farms for raising meat-producing animals. I honestly believe that any school, whether it be Cornell or schools located in the cities of Philadelphia, Chicago or New York, within visiting distance, there will be as many head of cattle as there will be surrounding these schools located in the country, or, in other words, in a radius or zone of twenty-five miles surrounding a city school, there will be found as many head of cattle as will be in a zone of twenty-five miles surrounding the inland state school.

I believe Dr. Williams has underestimated the percentage. I would say in the country veterinary practice, seventy-five per cent is dairy practice. There are some locations where that will vary considerably. Take along those lines, twenty-five miles

right here in Philadelphia, there are as many head of cattle, and I know there are around Chicago, as around Cornell.

DR. WILLIAMS: I was comparing only a few days ago the clinical report of two of our colleges, one in the country, the other in the city. Very few of our colleges issue reports regarding their clinical material. We have always issued reports regarding our clinical material because we believe that a clinical report better than anything else demonstrates the actual facilities for teaching. The other announcement which I examined was from one of our leading city veterinary colleges. The report shows that in the country school there was 100 times the amount of bovine clinical material as in the city school. I do not know of any city school which has shown by its published clinical report any great amount of clinical material among cattle, hogs, swine and in breeding animals.

DR. R. C. MOORE: I was wondering if there might not be a reason for the discrepancy in the great number of animals for clinics in city and country schools. I was told not long ago by a gentleman connected with country schools when they got short of clinic material they got pigs for castration—on that basis we would have a great number. I think in some of the city schools it is possible for a man to make $3.00 a day of the actual clinic material brought there for diagnosis, taking up three hours per day, sometimes our material will run to $6.00. I believe we have as much of a clinic as any veterinarians in the profession. Our lecture courses have diminished to a great extent. I do not believe they can be dispensed with, but they should be reënforced by the clinic, and by the autopsy, another important feature that is not receiving enough attention. Cases in the hospital should be watched carefully through their course or by students in a nearby stable or hospital, and brought right into the clinic to the college where the clinic is held, to be observed and a careful autopsy made, if death occurs, not only occasionally but time after time.

DR. GEO. H. MINER: I understand the sum and substance of what we want to discuss is not the advantage of the state college or the city or country schools, one over the other, but what the trend of veterinary education is and to take up the consideration as to what subjects the present conditions have helped in one over the other. We want to discuss the question of sanitation and the problems that are arising recently in animal husbandry and animal production. I do not believe we are gaining anything

by this discussion pro and con in relation to city and state schools and I would suggest that we confine ourselves to problems that really interest us in developing veterinary education and making an animal turn out more valuable for future work.

DR. HOSKINS: I want to answer these discussions. I had in mind that the trend toward multiplication of weak state schools was not for the best. They can't get beyond a few years' instruction for we cannot get the states to pay for more than two or three instructors, and they are always in political jeopardy for their support from year to year under our political system. What we do not want is to lean towards the multiplication of these schools; they are in a very large number of instances attached to agricultural colleges that are seeking large sums every year for their own maintenance. In our efforts for higher education the last few years we have driven out of existence some of the better private schools. We had better turn our attention towards the larger support of them and encourage the enlargement of them for the advantages they offer in larger cities, for there is not a problem today in veterinary medicine that is not covered within a radius of twenty-five miles of New York city, with its great laboratories, its great clinical institutions—federal and municipal—with its transportation problems, not only with our own country but with the world; with the relation of animal diseases to man in a great metropolitan district. The horse shows, the dog shows, the poultry shows, even the feline shows, all come within the province of veterinary medicine. I am saying that the hope of veterinary education does not lie wholly in state schools, but with state schools liberally endowed, for medical education is expensive; it costs $2,000 to educate a medical student, for which they receive $1,000. Veterinary medicine for the future must not be in the line of multiplying weak state schools, but strong schools in the great metropolitan districts, and to look both for endowment and state support for the maintenance of these schools.

DR. C. A. CARY: I want to say a word—let's get down to this thing. We are not going to settle the problem of education in five minutes and we are not going to change the facts. I have some idea of the conditions in New York and the South, and in Europe as well. I want to say that I have visited most of the prominent schools of this country and Europe and I have attended the clinics. I have never been in any one that has had all the things I thought it ought to have, or that they had a

corner on this whole thing, or, in other words, have written up a monograph. There are some things in the country we never have in the city, and vice versa, and, no matter how much they argue, it is a fact. We have a condition in the South which you have not much of in the North. They told me when I started in our small town of 2,000 inhabitants we would not have any students. I have had all the clinical work we could use, just as much variation as any schools I have seen with this exception—we do not have a great number of clinics. If I went to Dr. Hoskins, to New York, I would not see many things I see in my school. That is not a fault, not a fault of his school; it is a fact, nevertheless, and one we might get around—we find certain localities have their peculiarities in their surroundings and in their animal husbandry e. Just one thing I might mention. In Alabama, three years ago, there was not a carload of hogs shipped out. Last year in the peanut region we shipped 2,300 carloads, an increase in production last year of fifty per cent. These are facts from records made on these shipments. A good many of our men are doing more hog practice than anything else. Three years ago they could not have made a living in that neighborhood in that way. Yes, we want to get over this question and get together and do something and push things along. We are getting up into scientific areas, we want to get out and find these things, and so we are going to do something and not knock each other whether we have private schools or state schools. Some one says we are not getting what we ought to get. I believe you are getting all that is coming to you. Let us look the question square in the face and get to work.

FRATERNITY.*

J. W. Sallade, Auburn, Pa.

Anyone familiar with the history of this division of the A. V. M. A. realizes that the object for which it was formed has not yet been attained in full measure.

Annually good papers are presented and discussed. Subjects like "The Education of the Veterinarian," "Reciprocity and Equality in Veterinary Instruction," "The Curriculum and Veterinary Army Service" have been very ably discussed in papers by Drs. Bemis, Quitman and Turner, presented at the

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fifty-fourth annual meeting, and the discussion following reveals the fact that there is still a lack of coördination of the several bodies comprising this section and that we have not yet been able to find a concrete basis upon which to build a lasting co-operation.

It is generally known that many applicants for license are notoriously deficient and that it is claimed the same average conditions prevail among the graduates from all colleges (but not gracefully admitted). This leads us to believe that we can never have uniformity of product without uniformity in methods of teaching and that is the evident conclusion of men who have had experience in the examining room. Faculty members who have served on examining boards of the Veterinary Officers Reserve Corps, and have thus come in contact with graduates from all veterinary colleges bear testimony to the conditions found to exist by state board examiners.

Dr. Quitman in his analysis of the deficients gives the results as follows:

	Per Cent
Poor and improper teaching methods	50
Deficient education of students	25
Deficient intellect (tho educated)	25

And this places the fault half with the colleges and half with the student body.

All members of the state boards are very naturally not infallible, some perhaps are incompetent, but the fact remains that they have to deal with the college product as it is supplied by the colleges.

If that be fifty per cent deficient the blame should not be placed on the board which rejects some applicants.

Being members of the same society demands that we should associate as brothers. Good fellowship always considers the other man's viewpoint and respects him as a fellow being and his opinion as sincere.

These are strenuous times and we are forced into service of whatever kind it is decided our station in life should fit us for. Age limit only determines the kind of service one must render.

Fraternity in its broad sense includes a common brotherhood of all mankind. God created man in His own image; His mission is to serve God and mankind and to love his brother as himself.

It should therefore be our aim to dwell together in peace.

The object of this section of the A. V. M. A. is hearty co-operation between the faculties of the veterinary colleges and

the examining boards, in an effort to discover the cause of deficient training and how to remedy it. Thus far it has apparently been the function of at least some of those connected with the faculties to charge incompetency, irregularities, etc., to the boards and thus hope to escape responsibility. They argue that the questions used by the board should be submitted to them, not for criticism, but as a guide to enable them to prepare students to meet the requirements of the boards.

To my mind there must have been something the matter with the teaching or the manner of issuing diplomas to students, which impelled the enactment of laws creating state veterinary medical examining boards whose function it is to safeguard mankind and brute creation against charlatans and impostors, some of whom might have escaped from a recognized veterinary college.

In contention of that view it might be justly said boards do not fix the curriculum; they have no voice in selecting the teachers or in shaping the material from which colleges attempt to create their product, but are public functionaries whose duty it is to place the seal of approval on college work. Therefore, all veterinary colleges should teach the same subjects, have a uniform program, proper equipment and the best teachers available, to thoroughly teach every branch and instill the student mind with its beauties and its application.

Much care should be exercised in matriculating students. Preliminary education is a necessary qualification, but not the only one, and perhaps not the most vital one. Application and adaptability are important factors and a period of probationary service would probably develop those qualities.

Fee collecting with some colleges is the principal if not the only source of revenue and that may account for the insufficiencies complained about.

Good fellowship and moral courage will aid us in recognizing and applying the remedy. There can no longer be any question about the lack of knowledge many students possess after finishing a prescribed course in some veterinary college. That fact is too patent for contradiction. They should never have been allowed to continue to the end. Their money, time and energy applied in some other vocation to which they were fitted by nature would thus have been a real benefit and the examining boards which had to deal with them could have been saved many labored expressions by the faculty that must have and should have recognized his intellectual deficit.

The examining boards should be composed of men of mature judgment, experience and moral responsibility, whose aim and purpose it should be to honestly and impartially develop the product of the college. Their certificates must represent quality, their examination should be fair and practical and honestly cover the field of instruction. No good can result from asking catch questions. The element of fair play must not be lost sight of—justice to all, the guiding star.

While the faculties have a responsible duty to perform and are performing it conscientiously, the examining boards are equally charged with responsibility—that of safeguarding the general public against imposition from spurious pretenders.

Under their signature they guarantee the diploma, conferring privilege, honor and authority. Such being the high purpose of these several corelated bodies, it is self-evident that the same motive of action is dependent upon either and that our relations ought to be of the most friendly character.

In like manner we are responsible for the personnel of the veterinary profession and its power as a factor in the community.

If the spirit of coöperation and fraternal feeling is in us, deceit and duplicity may not enter into our relations. Faculties will welcome constructive criticism and weak points which may exist in the teaching of any subject receive correction.

If, on the other hand, examining boards become obsessed with the idea that it is their function to puzzle applicants for license with catch questions and thus not only discommode and as a result reject them, but also cast reflections on the college, they practice unfair tactics and perpetrate a wicked injustice on both.

Unfortunately, there does not appear to be any remedy for unequal standards of examining boards under state regulation, since the state acts under which we operate are so vitally divergent that common ground for reciprocity is not available. That, however, does not prevent us from adhering to a moral code, and if colleges were standardized and the curriculum uniform, students from any one of them should be able to acquit themselves satisfactorily before any board, provided such board is imbued with the power of the golden rule.

Our relations of faculty and faculty, of faculty and board and one board with another should at all times be amiable. Nothing that I can think of is more detestable than an endeavor to take undue advantage of another; by doing so is not only disreputable but brands you as an undesirable associate.

If this humble effort will stimulate some discussion along these lines I shall have reached my objective.

I can see the beauties of the subject but am incapable of exhausting its possibilities.

In the discharge of our several duties, the same ideals and motives must prevail. The primary condition of successful co-operation must be a fraternal feeling, a certain degree of mutual confidence.

The advancement of the veterinary profession and the preservation of its reputation are largely dependent upon our co-related functions.

DISCUSSION.

DR. F. C. WAITE: May I have the privilege, not as a military man but as Dr. Waite? I have been in professional work twenty-five years, devoting all my time to it, investigating medical schools of this country, and the navy schools of this country, and am very glad of an opportunity to give my opinion as to what is the matter with things brought out in this paper. I have had in my official work reports come to me from medical, dental and veterinary schools—I may say the proportion of students in veterinary schools is much greater than in medical or dental ones.

The veterinary students must be of more superior intellectual ability than those among the dental or medical men, or the teaching must be far superior, or the subject must be extremely easy, or what I believe is the real thing, that the pedagogics of teaching are not appreciated. I find several of the veterinary schools reported that all their students this year passed every course without a condition. Those who taught know that is not the case; in education the rate (total men who are conditioned and fail, according to reports) is from ten to eighteen per cent. We know dental education is not up to medical education, which is twelve per cent; total in veterinary schools is two per cent. The reports of veterinary schools for this year is less than two per cent of conditioned students; about eighty-five per cent of all men failed in not a single subject. These are facts and startling facts to me. Another thing I have learned which is startling to me as an educator is that the veterinary course in some of the schools of this country is not graded. I learn it is possible for a man to flunk freshman subjects, go along four years with those conditions hanging over him and then, at the end of four years, be denied

his diploma. Why? Because he had not passed the subjects three years ago, a subject or subjects which if it is a graded course is necessarily prerequisite to the courses above and instructors in reputable veterinary schools in this country are permitting men who have shown they have not the knowledge on fundamental subjects to go ahead and take subjects based on those and go on and on, and not dismiss them until the entire course has been complete and the inference is, not dismissed until they have paid their entire three or four years' tuition.

We might as well face these things. That is the thing medical schools did twenty-five or thirty years ago, things they got out of twenty years ago. They recognize the course must be graded, one subject is preliminary and requisite to another and a man should not be permitted to go on. I found a report from one school in which a man had flunked seven freshman subjects and the dean said he thought he could make them all up on opening of next term. These are some of the startling things in comparison with what is being done in medical and dental schools and I get to my feet, not as an officer, but as a teacher, to call your attention to these facts, that there should be something done in the question of regulation. We as teachers know we get in every class men who are totally incapable; in all of the veterinary schools of this country, this year, there has been only one man barred for poor scholarship, according to the reports I have received. Just one man!

In one dental school there were sixty-five men barred for poor scholarship and were told they could not return. A man who is a poor student and is allowed to go on certainly depreciates all the work of his college. I hope the stenographer will put my name down as Doctor Waite, not as Captain Waite. I am saying these things, I hope, to help you.

DR. N. S. MAYO: I wish to corroborate what Dr. Waite has just said. It has been sometimes pleasant but sometimes unpleasant to visit the veterinary schools of this country and inspect them for this association, finding the condition, from a teaching point of view, from an educational point of view, at a number of veterinary schools has been terrible. This hardly describes their condition. Not long ago a graduate of this last spring, a young man with a good preliminary training, a high school graduate, said: "I have graduated; now I want to go to a real veterinary school. Where shall I go?" I discussed a number of schools that were real schools. Another student said to me,

"So many failed in the class since I have joined it, and they were pretty sore about it." He said, "We are not kicking because they failed; we are complaining because they ever let them start, because every student who knew anything, knew from the beginning if they were not getting fair marks they could never get along." Where a student realizes that condition there is something wrong with that school. Another thing the writer of the paper touched upon is one I have thought of many times—and that is the question of eliminating from the schools students of veterinary medicine, those who never will be successful. So far as I know, this is not done in veterinary schools. Those of you who have taught know that after a year or a little more you can pick out some men that you are convinced that if they went to a veterinary school for ten years would never be successful in that profession. In some of the better medical schools—I do not know that they do it in all of them—they take those students and say, "You are not adapted to medicine; you had better quit; go somewhere else and find another sphere of usefulness." I know a young fellow who went in for aviation, aeronautics, a splendid student. They had him there a month or two, then said, "You are not adapted to aviation," but it was a kindness to that fellow to do that, and I believe the veterinary schools which have the real training of successful, leading veterinarians—a credit to their profession—at heart, should take up this question and help these young fellows that have started on the wrong track to get them in some other line of usefulness and success.

REQUIREMENTS FOR ENLISTMENTS FOR VETERINARY STUDENTS IN THE ENLISTED MEDICAL RESERVE CORPS.*

Captain F. C. WAITE, Washington, D. C.

Instead of having the above title, it should be "Love's Labor Lost." In June I was asked to come here and read a paper on this subject. They gave me two months to prepare it and I carefully organized things, and was all ready to give you the result of my efforts when I received orders that there was nothing to tell at the present time.

There was never any enlistment in the Medical Reserve Corps, nor in the navy nor in the Marines, and it is not possible for a

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man to get a commission now between eighteen and forty-five, as the door has been shut tight on all civilians. How long that is going to continue no one can predict and not knowing what is going to happen, no one can predict what the conditions of the future will be. I tried on Saturday to find what the situation was so that I could tell you. I went to the chairman of instruction on special training of the general staff, and that committee has charge now of all education and training in relation to the army, civilian instruction and training, and asked him what I could tell this body as to the present status and he held up his fingers and said so much—nothing. Nothing told at the present time. We hope something may be said in a very short time, but until definite orders come through nothing can be said as to what is going to be done with prospective or present students. I regret very much to have to be so unsatisfactory, but it is the best I can do.

THE EXTENSION VETERINARIAN.*

GEO. M. POTTER, Manhattan, Kansas.

It would be interesting to trace the growth of the medical profession, and the concurrent development of the veterinary profession, step by step, from the superstition and quackery of the dark ages to the triumphs of modern surgery and preventive medicine, but that is a part of the history of our profession with which this audience is entirely familiar, so I will pass directly to the consideration of my subject. The latest development along medical lines consists in the education of the public. No longer does the art of healing depend upon mysterious secrets to be jealously guarded by the physician, for the practice of medicine is a science dependent upon certain principles, which the people at large may understand to a degree. Preventive medicine has assumed great importance in the control of contagious diseases. The great plagues of the past can now be controlled by quarantine, preventive vaccination and the establishment of proper sanitary surroundings. Our success in controlling tuberculosis, typhoid fever and smallpox is directly proportionate, however, to the knowledge which the people have concerning these principles and the extent to which they make their habits of living conform to them. Education, therefore, becomes an important

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element in combating disease. The same principles apply in animal diseases, and tuberculosis, abortion disease, blackleg and hog cholera can be controlled by essentially the same methods. The same need of education is seen here, and in response to that need there comes forward the extension veterinarian.

Let us go into detail concerning the necessity of educating the owners of domestic animals. Our present methods of controlling disease, effective as they are, and yet so imperfect, are of very recent origin, and there has not been time for them to be generally understood and adopted. The revelations of bacteriology are so recent, so astounding to the lay mind, and have so changed our conception of disease that we should little wonder at the slowness of the public in accepting them. It was but yesterday that our animals ran at large upon the public range, and the older generation cannot forget the practices of former days. They have not changed their methods to conform to the changed conditions. Animal values have been so low that stock was often permitted to die rather than incur the expense and trouble of treatment. Competent and adequate veterinary service has not been present except in a few favored sections. The purebred industry and improved transportation facilities have disseminated disease far and wide. Ignorance and superstition still prevail to a large extent. These facts not only indicate the need for educational work but illustrate the difficulties. There are other difficulties. The inertia and indifference of the great mass of live stock owners impede progress; political interference hampers efforts for disease control, and dishonest selling of diseased animals is continually spreading infection.

But great as are the difficulties, the possibilities are even greater. Everywhere men are demanding better stock, and the more valuable animals require and receive better care. Every man who raises purebreds may be made a missionary for better sanitary conditions and better methods, if properly approached. Our agricultural colleges are ever striving to improve conditions, and our veterinary colleges are turning out men better qualified than ever before to handle these problems in an intelligent and scientific manner. There are now many organizations and wherever we find a breed association, a cow-testing association or a boys' and girls' club there we have a valuable agency for disseminating information. The work being done by our Federal Meat Inspection Service offers great educational possibilities which are being used to a limited extent.

The public is awakening to the dangers of human and animal diseases and their desire for wholesome meats and pure milk can be taken advantage of in any educational campaign.

THE WORK OF THE EXTENSION VETERINARIAN.

What shall we teach? Not surgery, not materia medica; these belong to the veterinarian and there is no necessity for trespassing upon his field. But there is need for teaching the fundamental principles of preventive medicine and sanitation. We must teach the stockman that disease is not a visitation of Providence over which he has no control, but that it is due largely to the conditions which he himself imposes upon his animals, and he can, by taking thought and employing correct methods, maintain his herds in health.

The stockman needs to understand the specific nature of disease, that blackleg, hog cholera, tuberculosis, etc., are each due to a definite organism and there are methods adapted to each which he may employ in combating them. He should learn that many of the infectious diseases, for which we have as yet no cure, can be prevented by proper methods of herd practice, and by vaccination. We should strive to give him correct information concerning biologic preparations, citing their limitations as well as their virtues, lest he, through disappointment at occasional failures, become skeptical of their value.

We must demonstrate the necessity of sanitation, pointing out the fact that dark, damp, filthy quarters harbor disease and lower the resistance of animals, while the opposite conditions promote health and vigor. The layman must be taught that pathogenic organisms cannot withstand the direct rays of the sun and he can best combat disease by flooding his stables with sunlight, by the use of disinfectants and by the liberal use of whitewash.

Finally, we must impress upon our stockman the importance of proper herd management. He must be constantly on the alert to protect his herds against the introduction of disease. There is ever-present danger in our traffic in animals, not only in the purchase of diseased animals, but because of the frequency with which disease is contracted from infected yards and cars. The quarantine of all newcomers until health is assured, therefore, becomes an important precaution. We must teach the necessity of isolating affected animals and the prompt employment of competent veterinary service where, in spite of precaution, dis-

ease breaks out. The rotation of pastures plays an important part in controlling both infection and parasites. Likewise the management of the breeding herd is of utmost importance in controlling certain diseases. In short, we should urge the adoption of a definite system of herd improvement as the most effective weapon in controlling disease.

THE MAN.

What qualifications must the extension veterinarian possess? First and most important is personality; those qualities which enable him to meet all classes of men and discuss their problems with them intelligently, sympathetically and yet with dignity; in other words, a "mixer." Second, experience is essential in order that he may convey the impression of one speaking with authority. If you will pardon the personal reference, the writer has found a varied experience, including postmortem work in meat inspection, field work, laboratory and investigational work and teaching, of the greatest value. Experience gives the breadth of view which is essential in educational work. Third, the ability to translate technical terms into the everyday language of the stockman. His audience must not go away bewildered by a lot of terms which they are incapable of understanding. The questions which the intelligent presentation of a subject is sure to call forth aid greatly in clarifying it. Here is tested one's ability to think on his feet, and here, if he rises to the situation, he can often do his most effective work. Here also a humor without sting, a repartee that does not cut, and a few well-chosen illustrations help to enliven the discussion and the audience departs in happy frame of mind. Other qualifications might be mentioned but these are fundamental.

RELATIONSHIPS.

What relations should exist between this new phase of veterinary activity and the established branches, such, for instance, as the regulatory work of state and nation, the college, and the practitioner. Regulatory work, if it is to be effective, must from its very nature become educational. Whoever has undertaken to control animal diseases has soon discovered the importance of public appreciation of the underlying principles of disease control. We have numerous examples; for instance, cattle and sheep scabies, foot and mouth disease and Texas fever. In regard to the last, we have, after twelve years of effort, accompanied by much friction and strife, gotten the work well organized and

progess in the future should be more rapid. Results have come more through education than compulsion. Who can say how much more rapid our progress might have been had there been a well-organized extension force to prepare the way? At the present time educational methods are being employed to very great advantage in controlling hog cholera, and the demand for information concerning other diseases is insistent and widespread. It is not too much to say that every effort at regulation should be accompanied by and even preceded by an educational campaign. Therefore, the relation of education to regulation should be intimate.

There must exist the same intimate relations between extension service and college and laboratory. Unfortunately, there has been somewhat of a tendency in official quarters to regard these as entirely separate and distinct branches, each to be confined to its own field without reference to the others. The extension worker must not concern himself with regulatory matters and all investigational work must be left to college and laboratory. But that is wrong. These various lines of activity are so interrelated and so dovetailed together that one cannot be altogether separated without doing violence to the whole. The extension veterinarian will naturally teach the ideas which he received in college, amplified by his own experience and the researches of the investigator. What he teaches will differ only in detail and manner of presentation; the principles will be the same. We must, therefore, keep in close touch with these other branches in order to be abreast of the times. On the other hand, he can himself contribute much. He meets many more stockmen than they, visits them on their farms and discusses their problems with them; consequently, his knowledge of conditions is much more intimate than that possessed by the college professor or the laboratory man. In his extensive travels he is in a position to gather valuable data, and as he gathers and interprets facts to his audiences he thereupon becomes an investigator of the first importance. It would be most unfortunate were we to permit our so-called division of labor to deny us the benefits of his observations in the field of investigation. The activities of the extension veterinarian must be closely linked with those of the college and laboratory.

The relations that should exist between extension veterinarian and practioner are not so easily defined. They are more personal and must vary according to conditions. This question of veter-

inary extension was raised by the writer last year at a meeting of this body. At that time the fear was expressed that this new form of activity might encroach upon the field which the practitioner regards as peculiarly his own. A venerable member of many years' experience as educator and practitioner gave as his testimony that he had no fear of this movement to educate the public. In his experience the enlightened client had always proved the most satisfactory one with which to deal.

There has also been a tendency among veterinarians to confuse the extension veterinarian with the county agent. The two are not identical, although the former must work much with the latter. The activities of the county agent along veterinary lines have engendered considerable heat among veterinarians, and indignation meetings have been held and resolutions passed. The veterinarian cannot justly be blamed for his resentment. He believes that a profession that is worth working for is worth fighting for. He has had to spend three or four years and much money to acquire it and pass a rigid examination before he can practice. His profession is at once his life work and his means of obtaining a livelihood. He sees what he considers an irresponsible person who knows comparatively little of the requirements of the practice of medicine come in, in violation of those laws which he himself must observe, and with semiofficial sanction begin to tear down his (the veterinarian's) work and deprive him of his living. It would be a poor and unworthy "stick" indeed who would not resent such treatment. But I would have the veterinarian pause and consider the facts. The county agent movement, too, has sprung up in response to a need. We needed a more systematic, a more purposeful agriculture and that could be brought about only through competent leadership, hence the county agent. The agent is usually a young man of college training, chosen for his fitness as a leader. It is his province to study the needs of his county and initiate movements to meet them. In case of outbreaks of animal disease he may appropriately take the initiative in a campaign for their control. But sometimes in his enthusiasm and desire to serve he oversteps the bounds. His partial knowledge does not permit him to realize his limitations and he makes mistakes, with the result that sooner or later "his chickens come home to roost." I had the experience of detecting such a mistake shortly after it had been made and demonstrated it to the agent in a manner that did not cause resentment. That same agent was a valuable man to his community, in spite of mis-

takes, because he was the only man to take the initiative in emergencies. He also turned much work to the local practitioners which they might not otherwise have received. Those in authority are beginning to realize the danger of permitting the agents to perform veterinary service, and this abuse may be expected shortly to correct itself.

In this same connection I cannot hold the veterinarian entirely blameless. He has not always filled the need of his community. He has not often enough regarded himself as a public servant but barters his services for so much money. Not frequently does he educate his clients in the principles of sanitation and disease control. Not often does he assume the initiative, in a spirit of leadership, for the control of outbreaks. Too frequently does he forget the duty he owes his profession, and is guilty of carelessness in diagnosis or treatment, failing to act the part of a professional man. Too often have I had the reply, when recommending to a farmer that he employ veterinary assistance, "Why, I can vaccinate my hogs myself and do a better, cleaner job than will Dr. Blank." What then can I say? Does not that reflect upon the profession as a whole? Does it not make ridiculous the complaint of the veterinarian, and strengthen the case of the county agent who will do a fairly satisfactory job without charge? These deficiencies we may refer to the failure of our colleges to inculcate in their students the idea of the responsibilities devolving upon the professional man. We as educators and leaders must strive to overcome these faults. We may have tried in a perfunctory sort of way, but there must be a conscious and concerted effort to make each and every student and every practitioner realize his responsibilities toward the public and toward his profession.

There is yet another angle from which to view this question. There has never been adequate veterinary service in the more sparsely settled sections of the country and war has accentuated this deficiency, as a large number of the most capable veterinarians have entered military service. A large part of our meat-producing animals come from those very areas. The diseases continue to operate, however, and there are few trained men to direct their control. In this our great national crisis we cannot permit these animals, so necessary for the food supply of the country, to die, so in the emergency we must call upon the most readily accessible help, which in this case can be rendered by the county agent. He is already rendering valuable service in the

campaign against hog cholera, in vaccinating against blackleg, and in many other ways. Until we can supply competent and adequate veterinary service we cannot well deprive the stockman of the only relief available to him, consequently the ideal must give place to the requirements of our present necessities.

The county agent movement represents progress. We know the fate awaiting him who attempts to impede progress; therefore, let the veterinarian beware how he opposes the county agent. The two can work together to mutual advantage and each should be willing to go half-way to meet the other.

Finally, I would have this body, this Section of Veterinary Faculties and Examining Boards, consider this whole question of veterinary extension. It is a new departure in veterinary education. Shall it be left to develop haphazard, or shall it be intelligently directed to meet the needs of the times?

Again, in regard to the county agent, the veterinarian feels that he has a grievance. Let us, the friends of education, take up this matter in a dignified and friendly manner with the proper officials, try to discover the causes responsible for any unsatisfactory conditions, eliminate them, and then join with these other representatives of progress for a better and more productive animal husbandry.

DISCUSSION.

DR. BEACHAM: I am sure we have all had thoughts on this subject. The question, as it appears to me, is, is it a menace? I believe it is worth while to give it the consideration that Dr. Potter has given it, with free and open minds, either for or against the subject. Just what do we mean by the term "extension"? We are all more or less familiar with the agricultural experiments of the last forty years, we are also well acquainted with the rapid growth of our agricultural colleges during the last two decades. We recognize the fact that some great achievements have been rendered during this time, but there was no way by which the information obtained by the experiment station could be extended to those most interested, as a very small percentage of even the boys on the farm were able to attend the agricultural college. The great mass of the farmers have neither attended college nor the experiment station; some means had to be provided for extending this information to the farmers; they must learn the sanitary principles underlying our successful activity. The extension service was established to render this

service; it was established by both veterinary and state legislation; it employs instructors and specialists; it has correspondence schools for students who otherwise could not obtain this education. The specialists cover nearly all the subjects connected with agriculture, forage crops, animal husbandry and live stock sanitation and the prevention of animal diseases.

We know there are experiment stations employed for a certain amount of research, our agricultural colleges have taken in medicine as a part of their curriculum, the experiment station is employed for precisely the same purpose. The extension service serves as a sort of package delivery between agricultural colleges. Another part of the extension service that Dr. Potter referred to is the county agent. In too many instances the county agent has overstepped the bounds of propriety and engaged in activities otherwise not intended for him or for which he had no particular training, but we must remember that the county agent is a man of no special training along veterinary lines; he has not had the benefit of any rules or regulations particularly defining the lines of his activities. He had to depend wholly on his own conception of the position. The farmer is anxious to learn, ignorant or rather unconcerned regarding the fine points of ethics, referred to the county agent for advice. Sometimes it was not easy for him to refuse. In too many instances he was too eager and jumped at the opportunity. Recently county agents are being more restricted in their activities; they are being controlled; rules are being perpared to govern their actions. It seems to me it would be much better for us to get in and help on these rules to safeguard his interests. Another service that we can render is to get the county agent and farmer to work together with the veterinary surgeon. I could cite county after county in which county agents have been located for two months to one and a half years where you have never met better coöperation in any county. By the exercise of a little tact and common sense on the part of the veterinary surgeon the two parties were brought together; since then they are working with absolute harmony, to the benefit of every one. Are we going to array ourselves against it and gain the ill will back of this movement and force the treatment of preventive medicine in the hands of those not prepared for it, or are we going to support it and try again to retain the interest of the live stock industry, without which the veterinarian cannot exist, and afford ourselves the

opportunity of confining the teaching of veterinary medicine or prevention of veterinary medicine to veterinarians?

DR. WILLIAMS: Dr. Potter in his interesting paper alluded to one special type of the extension veterinarian. Veterinary science has had a sort of dual or triple origin. The older veterinary schools in continental Europe were brought into existence for the purposes of the armies of Europe to teach regarding the diseases of horses, as an essential part of the military service. In this country, when agricultural colleges were founded, there was a widespread interest in the teaching of veterinary science as a part of agricultural education for the benefit of agriculture. Later we have come to the point where we regard veterinary education as meeting and coalescing with medicine. My work upon the diseases of genital organs of cattle relates to animal husbandry, to the production of human food, both in quantity and quality, and has a relation which has not yet been carefully studied regarding human health and life. When we reach the point of the influence of diseases of the genital organs of cattle upon human health the boundary line between human and veterinary medicine disappears. When agricultural colleges were first founded they nearly all included veterinary science in their curricula, not to make veterinarians, but to better fit men for agriculture. I started in that way, in an agricultural college, with a view to learning a little veterinary science to make me a better live stock husbandman. It was a tremendous fizzle, because I have never had anything to do with animal husbandry, but went into pure veterinary science instead. For five years I was paid a salary for teaching veterinary science to agricultural students; whether I taught veterinary science I will not say. So far as I know, I did no good. I did not know how to present the subject and I have felt that my work as a teacher of veterinary science in agricultural schools was largely without profit. We still have veterinary education in agricultural schools as a part of the regular curriculum. After my experience of five years I retired from the field for twenty years. I am now back again trying to teach agricultural students something along the lines which Dr. Potter has mentioned. I find there is a constant tendency on the part of agricultural students to ask for more and more regarding the treatment of disease and less and less regarding the knowledge I think I should give them. There is a constant conflict which I have not as yet been able to overcome. Students come to me from the agricultural college and ask whether they

may take the regular course in veterinary obstetrics. I tell them no, because they have not yet had subjects which are considered by me essentially preparatory subjects. Still, I think by being very cautious and limiting ourselves to the nature of disease and doing a very little work with reference to first aid with animals, a great deal of advising them what to let alone, I think we are making some progress. Extension work is old, as old as our agricultural colleges; they were founded about 1868.

We have another type of extension veterinary teaching to farmers, that of the lectures by veterinarians in farmers' institutes and farmers' meetings. We have the two plans in operation at present in the State of New York, the farmers' institute conducted by one set of authorities and certain other farmers' meetings by other authorities. The farmers' institute authorities employ veterinarians to attend these institutes and to lecture upon veterinary subjects. Being a great dairy state, one of the subjects talked about is that relative to abortion in dairy cattle. The men who are employed by the institute authorities to lecture upon the subjects are always in conflict in their teachings with my teachings in the state. I go very largely to the farmers' meetings and to the meetings of dairymen and dairy cattle breeders and say one thing and these farmers' institute workers tell another thing, and so the conflict goes on. In some states free veterinary extension work is carried on by correspondence. There is a force of veterinarians selected by the state, or the state university. The veterinarian does not see the animals at all. There has been a considerable resentment aroused. This is inevitable because the veterinarian sitting in his office and perhaps without practical experience cannot be expected to make the same diagnosis as the veterinarian who examines the animal, so there arises conflict and a certain degree of ill feeling.

I have been advised since I came to the meeting regarding an occurrence pretty close to Dr. Potter, in an adjoining state. I was watched by a man while I did a little instrumental work upon the genital organs of cattle. He had never done any of the work himself and started out at once teaching others how to do it. If he had entitled his work, "Teaching others how not to do it," he would have gotten along much better, because he gave to the live stock owner the idea that he knew just what to do. I think it is about as proper for a veterinarian, be he in extension work or other capacity, and I belive Dr. Potter will agree, as for a human surgeon to go out among people and teach the heads of

families to perform the appendicitis operation as to go out and instruct the owner of valuable cattle how to meddle with live stock. I do not care what branch of this extension service one takes up, no difference whether he teaches agricultural students in college, by correspondence, or as a traveling extension veterinarian like Dr. Potter, he should be very, very careful what he does and not try to teach things to men who are not teachable under the circumstances. There has always been danger and always will be of a teacher overstepping his office. We must leave diagnosis, surgery and therapeutics with veterinarians, and the greatest value we can give to popular teaching is to indicate where the boundary line lies between those matters which only the trained veterinarian is in position to comprehend and those which may be successfully taught to the layman.

There is one other plan for extending knowledge to veterinarians and that is by publications in the form of bulletins, circulars, etc. Personally, I favor these very strongly because the teacher can then place in writing over his signature what he wishes to say, and it stands there as what he has said. It is difficult to speak to people and not leave a wrong impression. For example, in a recent publication of my own, with regard to abortion of cattle, I stated that some of the things recommended could be done by the animal husbandman, some by an ordinary veterinarian, some by specially trained veterinarians. I got a letter of inquiry a few days ago asking how do I go at it to douche the uterus of a cow which is sterile? I said, send for the veterinarian who knows how. That is all the answer I had for that man and I can not and will not attempt to give any other. What impresses me in all this work is that every part of it should be carried out with the very greatest care that less harm should be done than good.

Professor Robert Graham has been discharged from the army and has returned to his work as professor of animal pathology at the University of Illinois, Urbana, Illinois.

A bill to establish a veterinary school in connection with the University of Illinois has been introduced in the Legislature. This bill has the support of the Illinois Veterinary Medical Association, the Live Stock Association and the university authorities. The prospects for its passage are good.

ANIMAL HUSBANDRY AND ITS IMPORTANCE IN A MODERN VETERINARY COURSE.*

H. H. HAVNER, Pennsylvania State College.

A statement with reference to the world's live stock situation will serve to establish more clearly the relationship and importance of animal husbandry in a modern veterinary course. From figures submitted by the Food Administration, the European live stock losses resultant by the war are: for our European allies, 47,000,000 head of stock; for Germany, 18,000,000 head; for Austria, Russia and Turkey, 35,000,000 head. The total European loss in livestock resultant of the war has been 100,000,000 head, or over half of the total amount of live stock in the United States. Upon the United States will rest the main burden of replenishing the breeding herds of Europe. Recently agricultural commissions representing in an official capacity their respective countries abroad have visited the United States and have inspected several breeding herds in this country, with a view of making purchases after the war. This is significant since it shows that European countries will likely turn to the United States for the foundation of breeding herds.

Pure-bred live stock breeders in the United States are very optimistic as to the future of the live stock industry in this country. During the next few years marked progress can be expected in all live stock breeding operations in this nation.

FEED QUESTION AN IMPORTANT ISSUE.

Aside from the importance of the live stock industry, the question of feed cost and food conservation should be briefly discussed. Because of the necessity for grain conservation, the Food Administration has urged a maximum use of non-edible human foods to a point as far as is practicable in the making of beef and pork. A campaign with this in view has been launched through the various agencies which by reason of their organization are in direct touch with the farmer or producer. The States Relations Service, through the extension service of the several agricultural colleges, has been the chief agency through which this campaign has been carried out.

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POINTS EMPHASIZED IN THE MEAT PRODUCTION DRIVE.

The points emphasized in the meat production drive which was launched in this country some time ago are:

(1) The use of a larger amount of roughage with a wisely balanced grain combination in order that the annual meat production of the United States can be increased without cutting any serious inroad into the grain supply that can be used for feeding our own population, as well as the population of our European allies.

(2) The keeping of more live stock—a policy much needed for the period of the war and also for the reconstruction period of the world's agriculture after hostilities have ceased.

(3) A well-outlined system of management for herds and flocks so that a maximum efficiency in production may be realized.

These fundamental considerations have been included in the live stock development program of a majority of our states where live stock constitutes the basis of successful agricultural development. For the most successful results in such a live stock program it is necessary that such a movement have the most active support of the producer, the consumer, all agricultural organizations, and, lastly, the most hearty support of all associations, which, by reason of the profession of the members, are closely allied with any general live stock policy.

Live stock constitutes the long-range gun of agriculture; the making of beef and pork by the use of non-edible human foods guards against a grain famine; efficient management of herds and flocks insures a maximum profit to the farmer; these are the underlying reasons for teaching animal husbandry in a modern veterinary course.

What animal husbandry subjects are most needed for the student of veterinary medicine? It is quite a common conclusion by a majority of all veterinary colleges that animal husbandry in a modern veterinary course should comprise such essential subjects as, "Types and Breeds of Farm Animals," "Animal Breeding," Live Stock Judging" (which includes both market and breeding animals), "Feeds and Feeding" and a "Live Stock Management" course, which should include subject material and practicums dealing with the fitting of animals for show, the harnessing, driving and improved methods of breaking horses to work, and lecture material, and, if possible, actual practicum work which deals with all phases of live stock management.

A majority of veterinary colleges could not be criticised for not offering these animal husbandry subjects. A lack of animal husbandry knowledge has been due in a large measure to the fact that the average veterinary student has not appreciated the importance of these subjects, and consequently has taken only enough interest to get a passing mark without making the best use of the material presented with a view of using it in the future.

The reason for this apparently half-hearted interest in animal husbandry by the average veterinary student while in college and for a time after graduation seems to be due to the student viewpoint that agricultural subjects, of which animal husbandry is a part, bears very little importance to the practice of veterinary medicine. It is found, however, that this viewpoint changes when the veterinarian has been out of college some five or ten years. The veterinarian is bound to discover sooner or later that his profession is in reality a part of the agricultural development of our nation. For the best success of the veterinarian and the live stock breeder one of the fundamental problems seems to be to get the student to appreciate the importance of the animal husbandry subject matter which is given as a part of the veterinary course. We will appreciate, I believe, the fact that the student's viewpoint of a given course and the interest he takes in the subject matter presented will depend to quite a large extent upon the ability of the instructor to present the material. The subject matter ought to be presented so that it will be fully understood and also should be given a practical application to the student's future work. One of our leading veterinary educators believes that the animal husbandry subjects should be taught by a man who has a degree in veterinary medicine, as well as a degree in animal husbandry. It is the idea of this educator that a man so trained will be in a position to present the important phases of the animal husbandry subject matter as it relates to veterinary medicine. One of the ways where improvement can be made in assuring a more thorough knowledge of live stock for the veterinarian is to take steps which will overcome the tendency of students to minimize the importance of animal husbandry in a veterinary course. In some instances this lack of sympathy for live stock subjects may be due to the way the subject matter is presented; in other cases it may be due to a lack of harmony and coöperation between the members of the faculty of the school of agriculture and the school of veterinary medicine, and, lastly, the scheduling of too many subjects

for one semester or year's work. The latter is bound to cause a neglect of the animal husbandry work offered. To insure a more hasty progress of the veterinarian in his work this matter is certainly worthy of thoughtful consideration for it must truthfully be admitted that if the veterinary student does not get hold of the fundamental animal husbandry subjects while he is in college it will retard his progress and the progress of agricultural development until he has learned these things.

There has been a tendency toward a spirit of fraternization of veterinarians and live stock breeders the past few years. This is shown by the holding of live stock breeders' meetings and veterinary associations' meetings on the same date and at the same place. While it has been advisable to hold separate sessions for each organization, the fact that the meetings were held at the same time has made it possible for joint meetings to be scheduled. At these joint meetings opportunity has been given for both veterinarians and live stock breeders to take part in the discussion. Many points have been cleared up by this open and above-board discussion, and it has been possible to proceed much faster with regulatory sanitary laws for the control of disease because of a common viewpoint. In many instances both a clear and a common understanding has been made possible because of a frank discussion of certain fundamental principles of live stock disease control. Both the veterinarian and the live stock breeder can be expected to share the responsibility that belongs to each of them providing a common understanding and a practical and workable plan of live stock disease control is mapped out.

For the success of our nation's live stock breeding enterprises it might be a very timely suggestion for all veterinarians and particularly the members of this association to give this subject of the relationship of the veterinarian and the live stock breeder some thoughtful consideration. If this relationship is established in a proper manner in the classroom in our colleges an important step will have been taken to insure closer coöperation and, therefore, more rapid progress in all matters pertaining to the interests of the live stock breeder and the veterinarian.

DISCUSSION.

DR. CONNOLLY: I think the time will come when we will put a veterinary education on the same basis as we have medical education. I think this association in the past has been working along wrong lines in this sense, that we have increased the pro-

fessional version of it at the expense of the preliminary requirements. I think an ideal veterinarian is one who has graduated at a veterinarian college and has done these things because he needs them as a farmer, and as a man who will give some help to develop the live stock interest. Then, too, on top of his agricultural education, as some of the members of this association have done, and they make splendid men. Some are splendid practitioners. As it is, I believe the time will come when we will regard some of the things mentioned as prerequisites. In our medical schools we regard a high school education necessary; in some schools, like Johns Hopkins, they require a collegiate education; in some others, they require two years' college work. I think it is not too much to require now, instead of two years of high school work, four years. I believe four years' high school work, with three years of professional work, will make a better veterinarian than an eighth grade man, as we used to have, with four years of professional work. Too many of them take up this kind of work without the fundamental training to help them out. The subjects that are mentioned by Dr. Havner, I see, are required in some of our state schools. Iowa, for instance, gives a good portion. Ohio puts it in its curriculum, but does not require it. I think it is elective. I believe it ought to be required because it makes better men. The stockman has more respect for you if you talk with him in his own language, can give him some advice on feed and feeding, and if you are a good judge of live stock, if you can select a good breeding animal; if you show some knowledge along those lines your business will be better.

PRELIMINARY REPORT ON ULCERATIVE LYMPHANGITIS IN HORSES OF THE A. E. F.*

First Lieutenant AUBREY H. STRAUS, Sanitary Corps, U. S. Laboratory No. 1,
and
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Under the heading of "Ulcerative Lymphangitis" we have grouped several pathological conditions, very similar in clinical appearance, which affect principally the limbs of horses and mules. Although we are uncertain as to the correctness of the term "Ulcerative Lymphangitis," it is the one which has been adopted by our French confreres, so, for the sake of uniformity, the term is retained.

*This article was prepared in July, 1918, but could not be published at that time. Changes in personnel prevented continuance of the work as planned.—Aubrey H. Straus, Assistant Professor of Bacteriology, Medical College of Virginia, Richmond, Virginia.

This disease has appeared among the horses of the United States army in France and has assumed such proportions, with a resultant loss of horses from the front, that a thorough investigation from a bacteriological standpoint, in the hope of finding some means of limiting the spread and of further improving the methods of treatment, was considered advisable.

The two classical forms of acute, contagious lymphangitis—that is, epizoötic lymphangitis and ulcerative lymphangitis, the latter type due to the bacillus of Preisz and Nocard—have frequently been encountered and recognized. Our attention, however, was speedily directed to another form, which we have now come to recognize as a predominant, in which neither the cryptococcus of Rivolta nor the Preisz-Nocard bacillus was to be found. Streptococci were found in sixty-one per cent of the thirty-six horses examined by us; no other organism of any significance being found in these cases.

All of the cases of ulcerative lymphangitis studied by us had been infected also with generalized mange. In addition to this, there were received from the surgical ward from time to time a number of cases in which the lesions of ulcerative lymphangitis appeared along lymphatics following an injury or an abscess.

Our observations have led us to believe that the portal of infection is either (a) through a break in the continuity of the skin, as is present among the lesions of mange, or (b) following traumatism. We have not been able to demonstrate the mode of transmission of the infective agent, but we believe it is by direct or indirect contact.

Ulcerative lymphangitis nearly always attacks the limbs, usually the posterior. The first symptoms noticed are a more or less pronounced swelling lameness and a slight rise in temperature, which may remain for several days before ulcerative lesions appear. There appears, nearly always below the hock or knee, a prominent, well-defined swelling, varying in size from that of a pigeon's egg to that of a hen's egg or larger. Clipping of the hair over the lesions shows a reddish swelling, immobile and elastic in pressure. There is little free pus, but usually a sero-sanguineous exudate. Necrosis takes place at the center of the swelling, leaving a deep ulceration with irregular borders, to which are attached threads of necrotic tissue. The lesions occur on all parts of the limbs, but particularly in the region of the pastern, cannon and fetlock. In some cases there occur later in the disease one or more large abscesses along the chain of

lymphatics, at various levels from the hock to the lymph glands. These secondary abscesses, upon discharging, yield an abundance of creamy pus. Specimens for bacteriological examination were taken both from the initial lesions and, where found, from the large secondary abscesses.

When culturing for bacteriological examination, the ulceration, including the surrounding area, is first thoroughly cleansed with some soapy disinfectant, as Liquor Cresolis Compositus. Sterile swabs are then used, inserting the swab as deeply as possible into the base of the ulceration. Cultures taken in this manner rarely show contamination, the causative organism being obtained in most instances in practically pure culture. In some instances, where feasible, the pus itself was collected from a freshly opened abscess, but cultures made from the swabs were quite as satisfactory.

In the first cases examined cultures were made on many varieties of media, including tubes for anærobic growth. White mice and guinea pigs were also inoculated with material direct from the horse. After noting the results from this work, the following rather simple technique has been evolved and has proven entirely satisfactory. Cultures are now made only on whole blood agar plates and in dextrose bouillon. These two media, together with slides of the pus stained by the method of Gram, disclose, we believe, in every instance the causative organism.

Cultures from thirty-six horses were examined. The predominating cause, as previously mentioned, was the streptococcus, twenty-two of the thirty-six horses examined showing the presence of this organism in almost pure culture. This streptococcus grows rapidly in dextrose bouillon, producing long chains and acidity; on blood agar small actively hemolytic colonies are produced, rendering its isolation very simple. Most of the strains so isolated proved virulent for guinea pigs, producing a large abscess at the site of inoculation, followed in some instances by abscesses in the lymph glands draining the site of inoculation. Owing to the scarcity of rabbits and white mice, very little work was done with these laboratory animals. We were unable in any of these twenty-two cases to find any other organism which would account for the infection. A few staphylococcic colonies occurred on some of the plates, but they were few in number and non-pathogenic for guinea pigs.

Four of the thirty-six horses examined were infected with the bacillus of Preisz-Nocard, three of them being so badly infected as to be considered incurable, while the fourth will probably recover. This organism was found in pure culture in the three severe cases and in a mixed infection in the fourth case. The virulence of all of the cultures was proven, the pigs inoculated dying in from fifteen to forty-eight hours following intraperitoneal injections and developing large abscesses following subcutaneous injections. This organism grows very poorly in bouillon. On whole blood agar dry, whitish, opaque colonies are formed; an increasing area of hemolysis is gradually formed around these. These colonies are easily distinguishable and, after a little experience, the morphology of the organism and the appearance of the colonies permit of a diagnosis being made in twenty-four hours. The organism on solid media gives a very dry growth which does not emulsify. The organism is Gram positive and very pleomorphic; granules and striations also occur. The bacilli are generally found in the slides made from the original pus, but not regularly enough to enable a diagnosis being made in this manner.

Of the ten remaining cases one proved a staphylococcic infection, four were found to be glanders and in five the cryptococcus of Rivolta was found. The latter was not found by culturing, but was readily distinguished on the slides made from smears directly from the lesions.

TREATMENT EMPLOYED.

This has consisted in the first place of a thorough cleansing of the field by shaving the hair and local disinfection. Many different lines of local treatment have been tried, among which may be mentioned surgical ablation, opening and curetting of the abscess, cauterization, etc. At present the routine treatment consists in opening the abscess, then curetting, followed by daily applications of dry antiseptic dressing. This is followed by cauterization of the excessive granulations. By these methods alone we have been able in the majority of cases to heal the initial lesion, but, unfortunately, in spite of the improvement in the initial lesion, secondary lesions occurred in nearly all cases.

In the hope of preventing, or at least diminishing, the tendency to the formation of secondary abscesses and relapses, we have tried vaccine treatment in the cases of streptococcic and staphylococcic infection. With the first horses studied auto-

genous vaccines were prepared and used. Later stock vaccines containing from four to ten strains of streptococci were employed. The streptococci were grown in dextrose bouillon for twenty-four hours, killed by heat (fifty-six degrees for one hour) and diluted with physiological salt solution to approximately one billion to the cubic centimeter. The vaccines were preserved with carbolic acid, five-tenths of one per cent.

By the use of this vaccine we have obtained a marked diminution in the number of relapses; in fact, we believe from our experience that, with a prompt diagnosis, proper local treatment as indicated and the administration of vaccine that secondary ulcerations in the streptococcic infection will rarely occur.

After trying various doses we are using the vaccine at present as follows:

First day	1 ½	billion
Second day	2	billion
Third day	2 ½	billion
Fourth day	3	billion
Fifth day	3 ½	billion
Sixth day	4	billion
Seventh and successive days, continuing with, until discharged as cured	4	billion

TYPICAL CASES.

No. 82, black gelding, admitted to hospital January 27 with numerous lesions on the right hind fetlock. Placed on local treatment February 15. Lesions smaller but not healed. Not much swelling in the leg, some excessive granulation. February 19, granulations cauterized. February 27, new prominent abscess size of hen's egg on upper right hind cannon, anterior internal surface. This abscess was firm and painful. It was opened and the necrotic center removed, local treatment also being used. March 8, cultures were made from this abscess and streptococci obtained in practically pure cultures. This streptococcus was virulent for white mouse, killing in thirty-six hours. It also produced a large abscess in a pig at site of inoculation, from which the organism was recovered. An autogenous vaccine was prepared and its use begun on March 11. April 15, horse nearly healed and no further relapses. April 18, autogenous vaccine discontinued and stock vaccine begun. April 26, discharged as cured. May 10, still in good condition.

No. 24, sorrel gelding. February 27, intense lymphatic swelling of the right hind leg. Very painful on pressure and marked lameness. March 1, a chain of abscesses appeared along the internal aspect of the limb, extending from the fetlock to the

inguinal region, following the line of the lymphatics. The abscesses were opened, a thick, creamy pus being evacuated. Local antiseptic treatment was applied. March 6, large abscess in right inguinal gland opened and cultures made. Steptococci present, but pure cultures were not obtained directly from the pus. Some of the pus was injected into a guinea pig and a large abscess developed. From this a hemolytic streptococcus was obtained in pure culture, no other organisms being found. The pig continued to develop abscesses one after another, finally dying after two months. March 18, cultures were again made and this time the streptococcus was readily found and isolated by the technique now used. March 22, use of autogenous vaccine begun. April 13, killed as incurable. This horse was selected for study on account of the severity of the infection, no cure being anticipated.

No. 56, bay gelding. This horse had been under treatment for mange and was considered cured. March 26, an intense lymphangitis of the left hind leg was noticed. March 29, an abscess evacuating reddish pus opened spontaneously on the outer distal third of the left hind cannon. Cultures from this abscess showed the presence of staphylococcus aureus in pure culture. This culture produced a large abscess at the site of inoculation in pig from which the culture was recovered. An autogenous vaccine was prepared. April 3, injections of the autogenous vaccine commenced. April 16, lesion entirely healed and swelling of leg markedly reduced. May 2, no relapse. Leg normal size and horse discharged as cured. Conclusions:

Horses examined	36
Streptococci found in	22
Cryptococcus found in	5
Bacillus of Preisz and Nocard	4
Staphylococcus aureus	1
Excluded as glanders	4

Second—As seen from the above table, the streptococcus is, as far as our observations have been carried, the organism to be regarded as the most frequent cause of ulcerative lymphangitis. This may not be true in many outbreaks but is undoubtedly true in the one studied by us.

Third—Clinical appearance alone is generally not sufficient to enable one to distinguish the different types of lymphangitis. Therefore if this disease is to be controlled we believe that a bacteriological diagnosis should be made on every horse as soon as received at the hospital. This is of importance, as we believe from work now being carried on that cross infections frequently

occur. In making the diagnosis it is of the utmost importance to first exclude glanders by use of the mallein and complement fixation tests.

Fourth—Vaccine treatment in the streptococcic type of infection has, in our opinion, proven successful in preventing secondary abscesses when combined with the proper local treatment. Among the cases studied so far relapses, where formerly the rule, have been found to occur rarely.

THE DIAGNOSIS OF FOWL CHOLERA AND FOWL TYPHOID INFECTIONS IN DOMESTIC BIRDS.

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There are present in this country, as well as in Europe, several diseases of poultry and of other bird species which are difficult to diagnose on the basis of the clinical features and the postmortem appearances alone; and diseases in which the recognition of the bacterial agent, even when discovered, is sometimes by no means a simple procedure. The diseases in which such confusion exists are found predominantly in poultry and in pigeons, although they may appear in other avian species. By poultrymen they are usually referred to as "cholera," an appellation which covers a multitude of maladies. Among pigeon fanciers the term "megrims" probably also covers a varied assortment of diseases so far as the actual etiologic agent is concerned. It therefore seems desirable that our views on the nature of the various infections embraced under these heads should be clarified and that we should possess some serviceable means of definitely differentiating the maladies by resort to observation of the clinical features, the postmortem appearances and the nature of the causative agent. It is the aim of the present contribution to give in a summarized form some of the results of several years' study and observation by the author on some of these avian diseases, and especially on the maladies popularly known as "fowl typhoid" and "fowl cholera," since it is these two that are most frequently confused, not by the poultrymen alone, but often by the bacteriologists as well. The chief difference between these types of infection may best be presented in the following table:

THE DISEASE.

FOWL TYPHOID.	*FOWL CHOLERA.*
Pathogenic changes highly variable.	Pathogenic features fairly constant.
Exudative or hemorrhagic symptoms, or both, are common.	Hemorrhagic symptoms most prominent, except in lungs.
Pericardial exudate (serous or fibrinous) common.	Pericardial exudate not common.
Leukemic condition often present.	Leukemia not present.
Degeneration of liver capsule common; liver enlarged.	Liver lesions limited to punctiform hemorrhages or slight parenchymatous degeneration; not enlarged.
Skin of breast reddened along keel.	Breast area not reddened.

THE CAUSATIVE AGENT.

FOWL TYPHOID	*FOWL CHOLERRA.*
Seldom present in blood in great numbers before death.	Always present in blood in great numbers.
Often absent from liver and spleen during disease.	Always present in liver and spleen.
Frequently attain length of 1.5 to 2.0 microns in media.	Seldom more than 1 micron in length, usually 0.6 to 0.8 microns.
Marked variability in size of rods.	Slight variability in size of rods.
Distinctly oval in young cultures and when fresh from tissues.	Distinctly short rod in shape.
May be gram-positive when fresh from intestinal content.	Always gram-negative.
Organisms stain peripherally.	Organisms stain more strongly at poles.
In blood occurs commonly as a diplobacillus or in short chains.	Seldom appears as a diplobacillus or in chains.
Young cultures (agar) may show long filaments.	Seldom if ever shows long filaments.
Old cultures show no viscous sediment.	Old cultures show heavy viscous sediment.
Grows well in ordinary media.	Seldom grows luxuriantly in ordinary media.
Grows well on potato.	No visible growth on potato.

BIOCHEMICAL.

FOWL TYPHOID	*FOWL CHOLERA.*
Produces terminal alkaline in litmus milk.	Does not change reaction of milk in 150 days.
Renders milk translucent.	Does not make milk translucent.
Produces acid in dextrin, dulcit, maltose in five days or less; does not ferment saccharose.	Produces no acid, or trace only, in these sugars, but produces (usually) acid in saccharose.
Cultures may give positive methyl red test (maltose infusion broth).	Cultures give negative methyl red test.
Cultures do not form indol nor reduce nitrates.	Cultures form indol and reduce nitrates.
Organism shows many variants biochemically.	Organism shows few variants.
Cultures usually produce H_2S.	Cultures do not produce H_2S.

TOXICITY AND VIRULENCE.

FOWL TYPHOID.	*FOWL CHOLERA.*
Culture filtrates may be highly toxic in small doses.	Culture filtrates give no toxic effects.
Organisms only moderately virulent (except at height of epidemics).	Organisms highly virulent (aggressive).
Cultures become attenuated with considerable rapidity.	Cultures retain virulence with considerable tenacity.
Organisms contain a definite endotoxin and possibly an exotoxin.	Organisms contain neither endotoxin nor exotoxin in the strict sense.
M. L. D. for rabbits usually large.	M. L. D. may be from one to four organisms.

SEROLOGICAL REACTIONS.

FOWL TYPHOID.	*FOWL CHOLERA.*
Agglutinates homologous antigen in high dilutions.	Agglutinates its homologous antigen seldom higher than $\frac{c}{320}$
Agglutinates *Bact. pullorum* antigen in equal dilutions.	Serum does not agglutinate *Bact. pullorum* antigens.
Cultures are agglutinated by *Bact. pullorum* serum.	Cultures are not agglutinated by *Bact. pullorum* serum.

IMMUNOLOGICAL REACTIONS.

FOWL TYPHOID.	*FOWL CHOLERA.*
Organisms are opsonized and phagocyted in immune animals.	Organisms are phagocyted to a slight extent only in immune animals and seldom in normal animals.
Animals can be immunized with difficulty by use of killed cultures.	Animals can be immunized only slightly if at all by killed cultures.
Animals can be immunized with difficulty by use of living attenuated cultures.	Successful immunization by means of living cultures is rare.

In connection with this table no special comment is necessary except in the case of pigeon inoculations. It has long been regarded a diagnostic test of the fowl cholera bacillus to obtain in the needle-tract, following the intramuscular inoculation of a pigeon, an area of yellow necrosis. It can scarcely be doubted that this reaction is characteristic of *B. avisepticus*. But the important point to observe is that essentially the same reaction may be called forth by the injection of other bacterial cultures, and notably by inoculation with certain members of the paratyphoid group, especially the subgroup which are anærogenic, such as *B. gallinarum*. In the case of many of these strains the necrosis is not so much yellow as it is grayish-yellow or grayish; but the difference between this and the *straw-yellow* of *B. avisepticus* is sometimes difficult to detect. From these data one may conclude that to diagnose a fowl cholera infection only on the grounds of a pigeon-inoculation, as is sometimes done, is by no means a safe procedure.

Taking into consideration all the differences between the two diseases, or their agents, mentioned in the table, the writer would recommend the following tests as affording the most rapid diagnosis of a suspected case of fowl cholera. The points may be grouped under the heading of (1) a presumptive diagnosis and (2) a conclusive diagnosis.

PRESUMPTIVE DIAGNOSIS.

1. Organism less than 1 micron in length and not predominately in pairs; numerous in heart's blood and in all the organs of the body.

2. Pigeon inoculation (intramuscular) results in death in eighteen to forty-eight hours, and upon autopsy shows straw-yellow necrosis along the needle tract in the breast muscle.

CONCLUSIVE DIAGNOSIS.

1. No growth on potato.

2. Viscous, "swirling" sediment in broth cultures after four to six days.

3. Does not change reaction or consistency in litmus milk cultures.

4. Cultures form indol and reduce nitrates, but do not produce H_2S.

5. Cultures ferment saccharose with slight acid-production, but do not ferment significantly maltose, dextrin or dulcit (only one need be employed for the test). Cultures do not ferment arabinose.

But all poultry diseases of the fowl cholera or fowl typhoid type, when judged by clinical features alone, are not necessarily fowl cholera or fowl typhoid. It now seems well established* that organisms of the paratyphoid B. type, similar in important respects to Schottmuller's *B. paratyphous* B, may occasion epidemics not only in poultry but in pigeons and in song-birds. It also seems probable that we must regard the paracolon organisms as playing a similar pathogenic role in birds. These organisms have been described from time to time in relation to poultry diseases and the present writer has made a study of several that manifestly belong to these groups. These paratyphoids and paracolons from poultry may be separated from one another by the same means that are used for the separation of the paratyphoid from the paracolon bacteria in the case of higher animals.

They may be separate from the anærogenic paratyphoids (next to be mentioned) as shown in the accompanying table.

*See Bulletin 174 of the Agricultural Experiment Station of the Rhode Island State College, 1918, pp. 4-216.

TABLE I.

PRESENTING SOME OF THE ESSENTIAL BIOCHEMICAL DIFFERENCES BETWEEN SOME OF THE PATHOGENIC BACTERIAL SPECIES FROM POULTRY.

Name of Bacterial Species	*Fermentation of*				Nitrate Reduced	H_2S Formed	Milk Alkalined	Milk Made Translucent	Viscous Sediment in Broth	Aerogenic
	Xylose	Maltose Dextrin Dulcit	Saccharose	Indol						
B. paratyphosus B.....	+	+	—	—	—	+	+*	+	—	+
B. paratyphosus A.....	—	+	—	—	—	—?	+†	—	—	+
Paracolon bacillus	+	+	—	+	+	+	—	—	—	+
B. gallinarum	+	+	—	—	—	±	+*	+	—	—
B. pullorum A.....	±	—	—	—	—	+	+†	—	—	+
B. pullorum B.....	±	—	—	—	—	+	+†	—	—	—
B. avisepticus	±	—	+	+	+	—	—	—	+	—

* Rapidly (6-10 days).
† Slowly (5-9 weeks).

In addition to these maladies there are other diseases in poultry in which one finds, as causative agents, a small group of three very closely related bacteria. Two are of the anærogenic paratyphoid type, the other aerogenic. The diseases are (1) bacterial white diarrhœa of chicks, (2) *Bacterium pullorum* infections of adult fowl and (3) the so-called fowl typhoid, caused by *B. gallinarum* E. Klein (=*Bact. sanguinarium* Moore). *Bact. pullorum,* which may attack both young chicks and old hens, can be distinguished from *B. gallinarum* in so far as the former does not ferment maltose, dextrin or dulcit with the production of acid; the typical *B. gallinarum* ferments these three carbohydrates. Moreover, *Bact. pullorum* alkalines milk very slowly (like *B. paratyphus* A), while *B. gallinarum* alkalines milk rapidly (like *B. paratyphosus* B).

Bact. pullorum, however, may be subdivided into two types. One produces disease in young chicks only, so far as known at the present time, and is probably always ærogenic; this organism, which corresponds with Rettger's *Bact. pullorum,* has been termed by the present writer *Bact. pullorum* A. The other type of *Bact. pullorum* not infrequently attacks old hens and sometimes causes severe epidemics and considerable loss; the writer has observed three such epidemics in the widely separate parts of this country. This type of *Bact. pullorum* is, however, anæro-

genic, like *B. gallinarum.* It has never been observed by the writer to form gas. Its other fermentative features, however, resemble those of *Bact. pullorum,* viz., it fails to ferment maltose, dextrin and dulcit. This type has been termed by the writer *Bact. pullorum* B. The full significance of the differences between these bacterial types cannot be grasped at the present time, but if progress is to be made in clarifying the paratyphoid group, in its broadest aspects, it is essential that investigators keep such differences in mind pending further study of the organisms concerned.

And finally it may be said that besides the fowl typhoid type, the fowl cholera type, the pullorum A and B types, the paratyphoid and paracolon types, there exist several other bacterial species which differ from any of the above, which are found only occasionally as the causative agents in poultry disease and whose systematic position is not yet fully ascertained. For example, the writer has described elsewhere three new bacterial species, all causative agents of disease in birds, and sometimes the etiologic factor of destructive epidemics. These are, respectively, (1) *Bact. jeffersonii,* doubtless one of the anærogenic paratyphoids, but differing in important features from other members of the group; (2) *Bact. rettgerei,** a salicin-positive organism calling forth a fowl-cholera-like disease in poultry, and clearly lying outside the paratyphoid group; and (3) *Bact. pfaffi,* another salicin-positive type, originating in an epidemic among canaries (Pfaff) and also lying outside of the strict paratyphoid group. These three organisms can be differentiated most easily by their fermentative features, which may be summarized as indicated in the accompanying table.

* Isolated by Rettger in 1909.

TABLE II.

SHOWING ESSENTIAL FERMENTATIVE DIFFERENCES IN THE THREE NEW PATHOGENIC BACTERIAL SPECIES, AND A COMPARISON WITH *B. AVISEPTICUS.*

Culture No.	*Designation*	Arabinose	Maltose	Dextrin	Dulcit	Adonit	Salicin	Saccharose	Lit. Milk
16	*Bact. jeffersonii*	+	+	+	+	—	—	—	Alk.
50	*Bact. rettgerei*	—	—	—	—	+	+	—	Alk.
96	*Bact. pfaffi*	+	+	+	—	—	+	—	*
48	*B. avisepticus*	—	—	—	—	—	—	+	*

* No change.

It should be added that these three organisms show no antigenic relationship with one another or with other known bacteria from poultry. They agree in the following points: (1) short rods, (2) non-motile, (3) gram-negative, (4) no polar staining, (5) non-liquefying, (6) indol not formed, (7) nitrates not reduced, (8) grow well on potato, (9) flocculent sediment in broth, (10) filtrates non-toxic for rabbits. Although the writer has observed the occurrence of *Bact. jeffersonii* and *Bact. rettgerei* only once, it is to be borne in mind that they were both isolated originally from "fowl-cholera-like" diseases. For this reason it would seem desirable that all cultures obtained from such poultry epidemics should be examined with some care to ascertain the frequency with which these new species may occur in the flocks of this country. *Bact. pfaffi* came from Europe and has not been observed by the writer in any American bird species.

SUMMARY.

It is the purpose of this paper to present the essential differences between the two poultry diseases, fowl typhoid and fowl cholera, with special reference to (1) the nature of the disease process and pathological alterations in the organs and tissues, (2) the causative agents *(B. gallinarum* and *B. avisepticus)* and their biochemical features, (3) their toxicity or virulence, (4) their serological reactions and (5) their immunological reactions. Also the differential characteristics of *B. gallinarum, Bact. pullorum* A and *Bact. pullorum* B are presented. In addition, there are mentioned three new species of bacteria pathogenic for birds *(Bact. jeffersonii, Bact. rettgerei* and *Bact. pfaffi)* and their distinctive biochemical features described.

PROBLEMS IN ANTHRAX CONTROL.*

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The history, etiology, symptomatology and pathogenic anatomical changes in anthrax is a familiar story. It is therefore unnecessary to reiterate these items so generally understood. However, experience in the successful control of recent extensive epizoötics convincingly supports certain facts or ideas which have heretofore either been unrecognized or at least not given their proper emphasis.

* Presented at recent meeting of the California State Veterinary Medical Association.

The role of the insect-carrier in connection with the spread of anthrax is now considered a fact, established, and its importance is properly magnified by recent observations. The growth of the rice industry and consequent flooding for long periods of a large percentage of the total acreage in certain sections of the state provide the ideal condition of grass blades over water for the multiplication of the large black horse fly *(Tabanus atratus)*. The superabundance of these pests as compared with former years in rice-growing districts, indicating that they are making the most of the opportunity thus presented; the fact that they attack animals in immense numbers as soon as they become too sick to fight, piercing the peripheral capillaries known to be teeming with anthrax bacilli during the last hours before death; the probability that these flies will leave the carcass of the sick animal soon after death to immediately pierce the skin of a healthy animal with a proboscis shown to be infected with anthrax bacilli by laboratory examination; all strongly emphasize the possibility of spreading the disease rapidly and greatly augmenting the losses in these communities. On the other hand, the fact that these greater losses do occur in the rice belt; that it is almost always among cattle and horses that the losses occur, while sheep, protected by their wool, go unaffected; that in horses there is often carbuncle formation, indicating local inoculation, and that in cattle there is quite a general tendency for only one or a few animals to be lost in a herd at first, followed in a few days by the almost simultaneous loss of several head; all indicate that this insect, the black horse fly, is actually guilty for the greatly increased losses from anthrax in recent years. Mosquitoes and other flies manifestly may play a similar role to a less extent.

It would be a regrettable circumstance if the growing rice industry and the old-established live stock industry should prove incompatible. The hope of maintaining both in the same community apparently lies in suitable methods of prophylactic immunization. This will be discussed presently.

In country that is naturally boggy, and in areas flooded by surplus water from rice fields, conditions for live stock raising may be greatly improved by drainage, or flooding the surface of worthless sloughs with crude oil.

Hot weather seems to exercise a peculiar predisposing influence, rendering animals especially susceptible, since it has been recognized that measures of control only overtake the spread of an epizoötic with the advent of cooler weather. There has been an

inclination to explain this by associating it with feed shortage, for it is true that during the extreme dry, hot weather feed is shortest and animals are forced to eat closer, increasing the probability of ingesting spores and injuring gums; also at this time they are attracted to feed in wet places where grass is green and anthrax spores abound. These theories, however, do not explain all the circumstances, for in the California outbreak of 1917 the disease continued to spread to new territory until the advent of cooler weather, which was not, however, accompanied by rains which could have improved pasturage, nor was it sufficiently cold to stop the activities of the flies. Again, in the case of the outbreak in 1918, a rain and cooler weather in late summer were accompanied by an immediate check in deaths, which was noticeable before it was possible for the grass to have grown sufficiently to improve feeding conditions. It, therefore, appears that sweltering hot weather, by its effect on the cattle, is itself a promoting factor in an anthrax epizoötic. The vegetation and rapid growth of the anthrax organism during very hot weather may be partially accountable, also, when the outbreak exists on boggy lands. While this is true, it does not mean that anthrax does not occur in cold weather, for a severe outbreak has recently occurred in mid-winter above an altitude of four thousand feet. Since, however, we are unable to exercise any control over weather conditions, this observation is of chief significance in connection with prognosis of an outbreak.

Thorough cremation of carcasses should always be insisted upon as one of the most potent means of preventing future losses. It is understood that putrefaction will destroy anthrax bacilli and it is recognized that probably, due to this fact, anthrax is not more widespread than it now is, but particles of blood and infectious material may become dried or otherwise escape putrefaction. It is therefore not sufficient to trust to the natural processes and even if the carcass is buried spores may later be brought to the surface by earth worms, burrowing animals or erosion. On the other hand, carcasses that have been thoroughly burned can never exist as future menace. Also, if suitable material is available, cremation may be accomplished at much less expense than burying, which is contrary to the general belief. This is because the proper method of burning is not generally adopted. Either moist stable manure or a damp, partially decomposed hay or straw stack bottom may be used. A whole load should be applied to each carcass on the ground where it

dropped, thereby completely covering it. A small quantity of coal oil may be used to thoroughly start the fire, which will burn for three or four days. At the end of this time the bones of the cadaver may be pulverized with the fingers, or found to have entirely disappeared. If a number of carcasses are burning in a field it is well to visit them all each morning with a load of manure, applying to each of them, if necessary, enough to cover an extremity or part that may have been exposed by the burning process. This will be found to be the most simple, efficient and inexpensive method for disposition of carcasses, and once adopted is used with satisfaction to all concerned.

To quarantine an infected herd on infected premises is not always the correct procedure, for experience has demonstrated that by this means anthrax on premises yielding mass infection can never be controlled. Repeated trials have also demonstrated that it is impossible with any vaccine now available to establish a high enough active immunity to prevent losses under such conditions. Not that cattle should be moved upon the highway undirected, to whatever point they may desire when deaths are constantly occurring, but, rather, that they may be moved when losses are temporarily checked by the administration of large doses of serum or from natural causes, under strict supervision, and to a point predetermined to be agreeable to all parties concerned. The herd must at all times be kept under close observation and, should a sick animal appear either on the road or at the point of destination, it should be destroyed immediately and burned. A stock owner who is losing animals at the rate of about five a day, after every possible method of vaccination has been applied, can be depended upon to find a suitable point of destination. To hold him to such infected premises by quarantine regulations is injustice to the owner and defeating the best interests of the community by forcing a condition under which it is impossible to stop the death of cattle which is certain to spread.

In herds affected with anthrax and in which deaths are occurring at the time of treatment the use, simultaneously, of anti-anthrax serum and spore vaccine offers the most successful and rational means of checking losses, this being supplemented when practicable by administering 50 c.c. doses of serum to animals carrying temperatures of 104°F. or above and larger doses to those manifesting visible symptoms.

From a purely theoretical standpoint, the administration of attenuated anthrax spores, to be followed in about four days by

the use of specific serum, would seem to offer a means of obtaining better results. However, there are no available data in support of this method. Experiments are therefore necessary to establish its safety and an extensive field trial to determine its value. The method appears worthy of development.

Spore vaccines should never be administered alone to herds in which infection is imminent, as a period of reaction follows their use, known as the negative phase, during which resistance is much lower. The disease is therefore augmented by their use, rather than prevented. Veterinarians should universally recognize this simple, fundamental principle of serum-therapy, for undoubtedly the thoughtless, indiscriminate use of these products, because they bear the name of vaccine, has in many cases been the means of inducing a severe outbreak which, if left to its natural course, would have been but a mild attack.

The simultaneous serum-spore method is not well adapted for use as a prophylactic, for the simple, good reason that as high a degree of active immunity cannot be established by this means as by another. The use of anti-sera, with attenuated anthrax spore vaccine, in connection with the production of an active immunity may well be considered as contra-indicated because its use prevents a good reaction necessary for the production of such immunity, and field experience demonstrates that a real protective degree of immunity following its use is short-lived.

The use of single spore vaccination should also be discouraged. While it must be admitted that some degree of immunity follows its use, it is of little real practical value, for in anthrax territory, if a ranch is known to be infected, infection exists in the great majority of instances to such an extent that a comparatively low immunity will not prevent losses.

Double spore vaccines, No. 1 and No. 2, are to be recommneded above all other *available* products for the production of active immunity in cattle. If a potent triple spore were produced it would doubtless be even better. The arguments usually directed against this method are that it necessitates handling the cattle twice at a consequent greater expense. It is, however, just as necessary that suitable pens and chutes be provided for one vaccination as for two. The real stockman has his ranch help employed regularly, some of whom devote most of their time to the live stock. Then, another day or part of a day devoted to a second vaccination would not appear to involve any great amount of expense from that source. The veterinarian's fee would be

offset by saving a single animal. It is therefore evident that the double-spore method, which offers some real protection, demands universal adoption, over other methods now available, as the prophylactic agent for anthrax; inasmuch as the actual losses prevented much more than justify its use in preference to a single injection of spores at somewhat less expense and inconvenience, and little protection; and in preference to a simultaneous serum-spore injection, with which, perhaps, the expense is just as great, the danger not proven to be less, and a very short period of effective immunity produced.

One fact further in connection with vaccination for anthrax control must be emphasized: never should a living vaccine be applied to animals in non-infected territory. To begin with, there is no excuse for using them; nothing to be accomplished by so doing. It must, further, be considered as malpractice, for it actually is associated with grave danger and most serious consequences. It is known to be a certain means of establishing new centers of infection and must sooner or later result in discredit to the profession and to biologics, which, used under justifiable conditions, are of much real vaue. This discredit may ripen into popular hysteria, which possibly may bring about the complete prohibition of their use, or, certainly, most stringent regulations, accompanied by license fees and high guarantee of ability for their application.

In connection with our field work, it is often considered desirable to confirm a diagnosis of anthrax by a laboratory examination, or to appeal to the laboratory for aid in establishing diagnoses in doubtful or atypical cases. To do this the laboratory must have suitable specimens. Time, temperature and moisture are the essential factors to be overcome in sending specimens, for these factors determine putrefaction. It has been remarked elsewhere that putrefaction destroys anthrax bacilli. Therefore negative laboratory findings are to be expected from old putrefied specimens and are never conclusive.

The most suitable ways of sending specimens consist of:

(1) Making a smear of blood from peripheral vessel or spleen pulp on a perfectly clean piece of glass; allow it to thoroughly dry in the air, not in direct sunlight and without heating. This may then be wrapped in cotton and forwarded for both cultural and microscopic examination. Do not place slides together with a quantity of blood between, as this will dry in transit, sticking

the glass together so firmly that they must be broken apart by force with consequent danger to the laboratory worker.

(2) A piece of clean, sterile gauze dipped in blood and allowed to dry in a similar manner is a good specimen. Positive results have been obtained in a specimen of this kind even after fourteen months.

(3) A few drops of blood drawn with a sterile syringe and transferred to a small sterile bottle or vial and sealed make a very desirable specimen.

(4) The farmer's method: Cut off an ear. This has been recommended because it is far removed from the digestive tract and is consequently not reached by invading putrefactive bacteria quite so quickly, and because the cartilage tissue of an ear does not readily putrefy. If this method must be adopted, therefore, do not remove also a pound of flesh to rot in transit; do not force it into a fruit jar from which it cannot be removed without breaking and do not wrap it first with a layer of absorbent cotton, which will draw all of the blood from the specimen. Cut off the ear about three-fourths of the way from its tip; wrap first in paper and then in cotton and always send material suspected of being pathogenic well wrapped, by express, since it is prohibited from the mails by United States postal regulations, unless sealed and soldered.

Several shipments of preparations sold as remedies for hog cholera and other diseases of hogs have been found in interstate commerce by federal food and drug inspectors and seized upon orders of the federal courts on the charge that these preparations were falsely and fraudulently labeled, according to a statement of the officials of the Bureau of Chemistry, United States Department of Agriculture, who are in charge of the enforcement of the food and drugs act. The Bureau of Animal Industry coöperates by supplying information regarding locations where these products have been used, the bad results following their administration, etc., and then furnishes affidavits and expert testimony as to the merits of the preparations.

The Ohio State Veterinary Alumni Association dedicates its March Quarterly to the memory of Dr. H. F. Detmers, founder and first dean of the College of Veterinary Medicine of the university.

CLINICAL AND CASE REPORTS.

FILARIA IMMITIS IN DOG'S HEART.

J. F. RYAN, Lagrange, Illinois.

An English bulldog, eight years old, weighing about fifty pounds, was brought to me in August, 1918, to care for until the owner returned from his vacation. The animal appeared to be in perfect health up to the eighth day. I found him very weak and depressed, tottering in his walk, was hardly able to get up four or five steps on the verandah. I suspected too much heat, as we were having a hot spell in the high nineties. On closer examination I found a most irregular pulse, dropping four and five beats at a time, temperature 102°F. Gave him a stimulant (aromatic spirits ammonia, one dram, in one ounce of water); he became weaker during the day, being unable to stand on hind legs by evening. A couple of hours later he began to moan and whine, appeared to be suffering a great deal of pain. Gave him a 1/16 of morphine, which eased him until 5:30 a. m., when he again whined. I found him unable to rise and apparently suffering intensely. Gave 1/16 morphine. He died three hours later. I suspected some form of heart trouble. Made autopsy. All internal organs appeared normal, even the heart. On opening the right auricle I noticed an antemortem clot in the valve. On removing it a long, thread-like worm came away with it, the longer part extending into the ventricle. It measured eleven and one-half inches. I recognized it as a *Filaria immitis*.

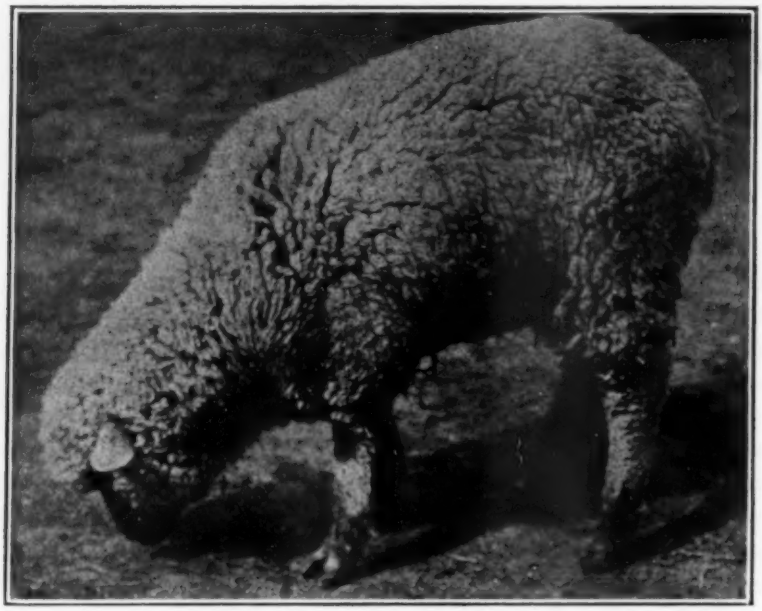
These worms are rather common in the South and the tropics. I never have heard of them being found in this latitude.

This dog was born in New Jersey and never lived elsewhere until he was brought to Lagrange, Ilinois.

GID IN SHEEP.

I. E. NEWSOM, Fort Collins, Colorado.

This case is reported largely for the purpose of establishing an accurate record of the presence of the Gid parasite in Colorado since Hall, in the Bureau of Animal Industry circular 193, published in 1912, makes the following statement: "The parasite has been reported apparently correct from Ohio, Illinois, Michi-

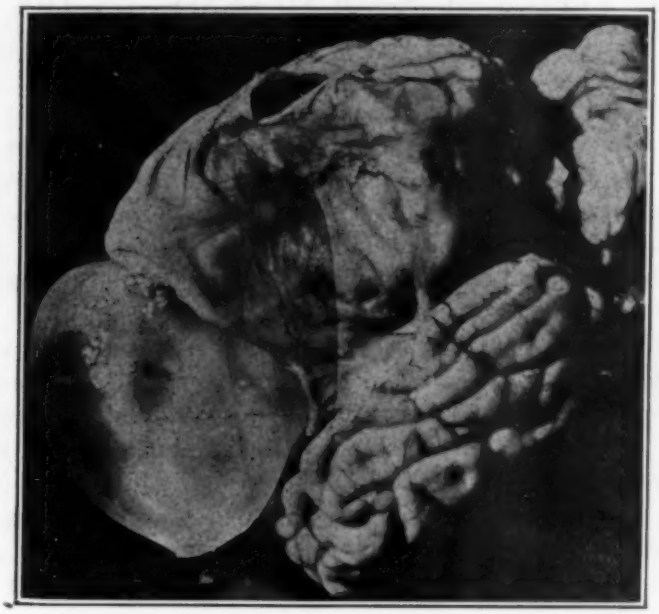


Sheep Infested With Gid Parasite.

gan, Missouri, Kansas, Indian Territory and Nevada, but there are doubtful records from Utah, Colorado and Tennessee."

This band consisted of 1,560 lambs shipped from Montana in December and placed in the feed lots near Fort Collins. It was said by the owner that within a few days after they arrived one or two animals were noticed to be acting queerly. The band was first visited by the writer at the request of Dr. R. N. McCarroll, a local practitioner, early in March. At this time there were some fifteen or twenty head showing cerebral symptoms and two lambs were down in a comatose state. One of them was said to have been down for several weeks. These two lambs were slaughtered and on examination of the brain the Gid parasite was readily discovered. In the head of a sheep that had died four days previously the same condition was found. On a later visit, of two lambs that had died, the parasite was found in one but not in the other. At this time two of the worst affected were brought to the veterinary hospital at the Colorado Agricultural College, one of which is shown in the picture.

No. 1 was operated by Dr. H. E. Kingman on March 12. On clipping the wool over the cranium a softened area about the size of a quarter was quite noticeable. On account of this it



Brain Showing Presence of Gid Parasite.

was not necessary to trephine. However, on passing through the meninges only cerebral substance appeared. A small trocar was then passed and the bladder was struck about a quarter of an inch deep in the cerebral substance. On enlarging this opening the bladder was readily removed and the operation finished. The patient died on the night of the 13th.

No. 2 was operated on March 13 and here again a softened place was found in the cranium, although the bone had not been entirely dissolved. The operation was successfully performed, but the patient died on the night of the 18th.

It seems probable that there are twelve or fifteen more animals affected in this lot. The symptoms are turning the head to one side and walking in a circle. Finally the lamb goes down and there appear to be days when considerable improvement is noticed, followed by days of coma. The symptoms appear to last anywhere from one week to two or more months.

The fact that these lambs came from Montana is quite significant, since that state seems to be much more affected than any other. For those who care for a more extended discussion of the Gid problem it can be found in the writings of Hall, more particularly as appears in bulletin 125 and circular 165, Bureau of Animal Industry.

THE EFFECT OF "GROUND GLASS" ON THE GASTRO-INTESTINAL TRACT OF DOGS.

N. S. Mayo, Chicago, Illinois.

In the Journal of the American Medical Association for December 28, 1918, Major J. S. Simmons and Lieutenant W. C. von Glahn of the Medical Corps, U. S. Army, report the results of tests on dogs of giving ground glass in the food. These tests were made at Fort Sam Houston, Texas, on ten dogs obtained from the city pound of San Antonio.

The dogs were fed varying doses of five grades of glass, varying in size from "large broken" to "fine powdered." The dose of glass was mixed with 200 grains of lean meat and fed immediately. A careful record was kept of each animal and daily observations were made of the feces for evidence of blood, pus or mucus. Only one dog showed a slight temporary diarrhœa and rise of temperature, after which the feces were negative.

The following quotations give their necropsy findings and conclusions:

"The dogs were killed with chloroform and immediately examined. The postmortem findings were remarkably uniform in the absence of any visible lesions. As the findings were so similar, detailed account of each will be omitted and one protocol given:

> The peritoneal surfaces are smooth and glistening and there is not any excess of fluid in the peritoneal cavity. The omentum contains much fat. The intestines are not distended. The lymphatics are engorged and beautifully marked out, so that they are easily traced from the intestine through the mesentery to the glands. The stomach contains a large amount of undigested food, in which particles of glass are readily discernible. The gastric mucosa is gray and translucent. There is no ulceration nor any evidence of hemorrhage. The intestine contains a moderate amount of digested food in the upper half. The intestinal mucosa is gray and translucent, and there is no ulceration, hemorrhage or exudate present. There are several tæniæ and many uncinariæ present in the lower portion of the bowel. The lungs, heart, spleen, pancreas and liver are negative.

The postmortem findings in the control dogs were identical except for the absence of glass.

For the microscopic preparations from six to twelve segments of the intestine from different portions were removed before the bowel was opened. This was done to avoid the possibility of any trauma to the mucosa while opening the bowel. These segments measured from 5 to 10 mm. in length. The stomachs were opened before the specimens for microscopic examination were removed. The tissue for examination was immediately placed in ten per

cent solution of formaldehyde. The paraffin method was used in the preparation of the material for sectioning.

The findings microscopically were equally negative. The sections from the stomach of each of the dogs and from the control dogs did not show any abnormal changes. The epithelium was intact and there was not seen any infiltration with leukocytes or small round cells of the mucosa, submucosa or muscular layers in some of the sections. From the intestines of four of the dogs (3, 4, 6 and 7) there was seen some denudation of the tips of some of the villi of their epithelium. There was not, however, any exudate on the surface of the villi, or any inflammatory reaction within them. No other abnormal changes could be found in any of the sections. The central lacteals and lymphatics were engorged in those dogs that were examined during the period of active digestion. The gross and microscopic findings were identical on the dog that was given one large dose of glass (50 gm.) and examined postmortem forty-eight hours later.

In both of the control dogs, denudation of the tips of some of the villi of their epithelial cells was observed.

CONCLUSION.

The ingestion of ground or powdered glass has no toxic effect and produces no lesion, either gross or microscopic, on the gastro-intestinal tract of dogs."

The writer was recently consulted as to the effects of powdered glass on swine. While not able at that time to give a definite answer, the opinion was expressed that it might cause some irritation of the gastro-intestinal tract, but it was doubtful if it would cause death.

Some years ago a case came under my observation where a man was convicted of attempting to kill a neighbor's cattle by placing broken glass in the food. As I recall, no cattle were injured.

The experiments of Major Simmons and Lieutenant von Glahn show that, while ground glass in food appears to be a fearful matter, as a matter of fact it does not have any deleterious effects.

Dr. Charles P. Wilson has recently received his discharge from the army and has resumed practice at Decorah, Iowa.

Dr. H. C. Graham, formerly of the Veterinary Corps, Camp Greenleaf, is now located at Barrytown, Michigan.

COMPLETE PROLAPSE OF THE UTERUS OF A COW.

S. A. GOLDBERG,
Department of Pathology and Bacteriology,
New York State Veterinary College, at Cornell University, Ithaca, New York.

A three-year-old grade Jersey cow weighing about 800 pounds. She calved apparently normal in the evening and was found dead with a prolapsed uterus the following morning. Autopsy at 3 o'clock in the afternoon.

The external examination showed that the animal was in good condition. The abdominal cavity was greatly distended with gas. The uterus was prolapsed completely and one horn was nearly

Everted left uterine horn showing colyledons and a small part of the remaining fœtal placenta.

entirely everted. This horn was hard toward the body of the animal and the everted sac contained a considerable amount of liquid. On the everted part near the tip there were portions of the placenta adherent to some of the cotyledons. The rest of the everted mucosa was dark red, due to diffuse hemorrhage and to hyperemia.

Internal examination showed a considerable amount of subcutaneous, omental and subperitoneal fat. There were petechiæ and ecchymoses in the subcutaneous tissue over the sternum. On

opening the abdominal cavity a considerable amount of dark red liquid escaped. There were numerous fibrous tufts and ecchymoses on the mesentery.

The wall of the uterus was greatly thickened by œdema. The left horn was nearly entirely everted. It contained about eight liters of dark red liquid, the uneverted right uterine horn, and a large strangulated loop of small intestine. This portion of the small intestine was dark red in color, while the rest of the intestine was normal. On section, the mucosa of the strangulated loop was reddened and thickened. There was a considerable amount of hemorrhage and hyperemia in all the coats of this portion of the small intestine. The fœtal membranes were attached to the cotyledons of the right horn, as well as to those of the uneverted part of the left horn. All the cotyledons, however, were of a dark red color, due to hemorrhage.

The spleen was darker and softer than normal. On section, the pulp was semi-liquid in consistency and of a dark red color. The splenic corpuscles were invisible.

The kidneys were pale and soft. On section, the cortices were yellowish and soft, while the medullæ were congested. The kidneys bulged on section and the capsules peeled easily.

The liver was lighter in color than normal and somewhat enlarged. On section, it bulged and the parenchyma had a sort of cooked appearance.

In the lungs there was an adhesion between the parietal pleura and the left apical lobe. There were reddened fibrous tufts scattered on various parts of the pleura. Both apical lobes were congested and in places they showed small hemorrhages. Both caudal lobes were pale. There were areas of emphysema in various parts of both lungs.

The mammary glands were somewhat congested. This was more pronounced in the anterior quarters. Otherwise the glands appeared normal.

Microscopically, the everted uterine horn showed necrosis of the superficial layers of the mucosa. The epithelial layer was replaced by fibrin, hemorrhage and numerous polymorphonuclear leucocytes. The arterioles and capillaries were greatly distended with blood. In the deeper layers of the mucosa there were numerous polymorphonuclear leucocytes, fibrin, and marked active hyperemia. The glands were slightly degenerated and there was some hemorrhage in the lumina of the tubules. The muscular coats showed marked active hyperemia and few polymorphonu-

clear leucocytes. In the strangulated portion of the small intestines the mucosa showed the epithelium almost entirely gone, but a few glands in the deeper part of the mucosa remained. There was much hemorrhage, fibrin and active hyperemia in the mucosa. The other coats showed hemorrhage and hyperemia.

Media inoculated from the liver gave a growth of *B. coli.* Media inoculated from the spleen gave no growth.

Diagnosis: *Immediate cause of death,* toxæmia or exhaustion.

Fatal illness: Eversion and prolapse of the uterus (diphtheritic metritis). Strangulated hernia of part of the small intestine into the everted uterine horn.

Secondary lesions: Acute parenchymatous nephritis and degeneration of the liver.

HEMORRHAGIC SEPTICEMIA IN HORSES.

JOHN PATTERSON, Hedrick, Iowa.

Hemorrhagic septicemia in horses is a condition about which we are unable to get much first-hand information. Outbreaks are reported, the disease is said to exist, but nothing definite is confirmed. Detailed information regarding the pathology and symptoms are lacking. A great many of the outbreaks are diagnosed symptomatically and no effort made to confirm it in the laboratory.

If this short article will be of any assistance to another practitioner, or if it will stimulate or assist in the further investigation of the disease, the purpose will be accomplished.

This outbreak occurred in the months of February, March and April of 1918. It included eight horses in all—three died of the disease, another, which would have died eventually, was killed for postmortem purposes, and four recovered, as will be noted later.

A few days previous to February 17 two horses had died showing the same symptoms as No. 3, which was sick at this time. On the day before the animal was in the harness all day and ate the usual amount of feed in the evening. Nothing out of the ordinary was noticed by the owner.

The next morning was found down in the barn and unable to rise, pawing and striking continually, nostrils dilated and breathing rapidly, pulse fast and weak, temperature 97.5, bowel movement seemed to be normal.

When placed in an upright position the symptoms were less marked and the animal would eat both hay and grain, as well as drink water from a bucket. When assisted to the feet with slings he would support himself and move about the stall as much as slings would allow. When the animal was down there was trismus of the muscles of the neck and the neck held in the position of lordosis.

At this time the diagnosis was problematical and was withheld.

Treatment in the way of purgatives and stimulants was given.

On the second day following the animal died and on account of the very bad weather only a limited postmortem was held. The blood was dark, with not much tendency to clot. There were numerous small petechiæ on the atria of the heart—large blotch-like hemorrhages beneath the epicardium and on the muscular pillars beneath the endocardium. We consider these lesions as almost pathognomonic of hemorrhagic septicemia in the domestic animals.

The day before this animal died a colt, No. 4, was down in the next stall, unable to rise without the sling, and manifesting the same symptoms as No. 3.

This colt was given 200 mil. of the anti-serum prepared at the state biological laboratory for hemorrhagic septicemia in cattle. The next morning was given 150 mil. more. This colt received no other nor further treatment and in a week's time was turned out to pasture in a nearby orchard.

On March 22, thirty-one days after No. 3 had died, horse No. 5 was found down in the barn early in the morning, but by the time we reached the farm was up eating and apparently all right, since the temperature was normal and no clinical symptoms visible. This, however, was a mistake, for at 3 p. m. the horse was down again and another one, which made No. 6, was also down. This time there was no mistaking, for they both showed the same violent symptoms as seen in the previous animals.

They were assisted to their feet and given an aloes ball and arecoline. When on their feet the symptoms almost entirely disappeared and the same appetite for feed and water was manifested as in the other cases.

On account of the fact that we were unable to get more of the anti-serum from the laboratory, colt No. 4 was bled from

the jugular. The clot was removed and these two cases, Nos. 5 and 6, were given 90 mil. of the serum intravenously. This injecting was done on the next morning after they had taken sick in the afternoon previous.

Both of them were given 60 mil. of the colt serum each day for two days.

On the third day after No. 6 came down sick she was turned out in the lot, apparently as good as ever. At this time No. 5 was still in the sling.

Up to this time all of the animals had been in the same barn. Those that had been getting hay and corn to eat were changed to straw and oats and vice versa. Others had hay and oats, while some had straw and corn.

Two days after Nos. 5 and 6 came down a black filly, No. 7, was found down and unable to rise in a pasture adjoining this barn. She was dragged to the barn on a sled, put in the sling and given the same line of treatment with the colt serum that Nos. 5 and 6 had received. It was necessary to keep her in the sling for about ten days, after which time she was turned out, fully recovered.

About this time the owner was running short of work horses and went to a nearby market, where two aged mares were purchased. This team was stabled in a large shed some 300 feet from the previously mentioned barn and on higher ground. It was also about 100 feet from the pasture in which No. 7 was at the time of taking sick. This mare was on the place just ten days when she came down sick in the same way that the others had done. She was given one dose of 100 mil. of the colt serum and made a rapid recovery in a few days.

No. 5 showed much improvement the first seven or eight days and then began to fail until on the tenth day was unable to support his own weight in the sling. He was killed and a very complete postmortem, which took some three or four hours, was held. The following were the findings: Blood very dark and showed marked hemolysis, petechiæ on mediastinal, prepectoral and mesenteric lymph glands; approximately three pints of straw-colored fluid in the pericardial sac; hemorrhages beneath the epicardium and the very characteristic hemorrhages of the endocardium, which at times seemed to extend into and follow the muscular striations of the myocardium. The entire body was dissected and no other lesions found.

Samples of the blood, pericardial fluid, part of the lymph glands and the entire heart were forwarded to the department of veterinary investigation of the state college for a laboratory diagnosis.

Large numbers of bipolar staining organisms were found in the pericardial fluid. They were not, however, pathogenic for laboratory animals, and would not grow on laboratory media. Whether or not they are pathogenic when found in the animal at this stage, whether or not the treatment given the animal had destroyed their virulency and the animal died from the lesions produced, or whether climatic conditions or some other unknown factor influenced, is only to be conjectured. The lesions found in the organs were typically those of hemorrhagic septicemia.

In fifteen days after No. 8 had recovered she was bled from the jugular and the remaining horses on the farm were given 100 mil. intravenously. Whether or not the disease had run its course cannot be determined, but no other animals became sick after the treatment.

SUMMARY.

The disease was not caused by the feed, since all sorts of changes were made in feeding corn, oats, clover hay, straw and corn stover, as well as corn fodder. There was not any one combination of feeds that any two animals had after the first two died.

An analysis of the water showed it to be typical of Iowa waters. All animals drank water drawn from the same well, but from different containers.

All animals given medicinal treatment alone died, while all those given either the laboratory serum or the serum from the recovered colt lived, with one exception.

The lesions of the heart may practically be considered pathognomonic.

Dr. Sam Heath has bought the practice of Dr. J. A. Fries at Durand, Michigan.

Captain E. C. Jones has been transferred from Camp Kearny, California, to Fort Oglethorpe, Georgia.

Dr. C. B. Griffiths, formerly of Baileyville, Kansas, is now assistant in the Veterinary Department at the Kansas State Veterinary College.

ABSTRACTS.

POLYNEURITIS OF FOWLS.

(Contribucion al estudio de la polineuritis de las gallinas.)
C. SANZ EGANA. *Revista Vet. Espana.*
Vol. XII, No. 6, June, 1918, pp. 241-247.

The author has encountered in Malaga a polyneuritis in fowls which he regards as due to "deficiency" or avitaminosis. The flock in which the disease appeared was kept exclusively for the purpose of consuming injurious insects, and had to live almost entirely on what food the ground provided. Occasionally a feed of seeds of sweet sorghum was furnished to them in special circumstances, but this was seldom.

The disease presented itself generally in a chronic form, and the first symptoms which indicated illness were pains in the legs and difficulty in walking. The gait was vacillating, with incoordination of movements. Little by little the paresis increased, the feathers were held erect, and the wings became involved and pendulous. Paralysis of the neck was accompanied by rigidity and contractures simulating those of tetanus, and there were manifestations reminiscent of those exhibited by a pigeon from which the cerebellum has been removed. Dysphagia accompanied paralysis of the neck. Respiratory symptoms (acceleration, dyspnœa) and general emaciation were very marked. General sensibility diminished greatly. In most instances the disease lasted from fifteen to forty days, but there were more acute cases in which death ensued in from five to eight days.—*Vet. Rev.*

FRACTURE OF THE NAVICULAR BONE.

Bérrar, in the *Deutsch Tierärztlich Wochenschrift* for 1913, discusses this subject. Fractures of the navicular bone are usually effected in the transverse direction and situated in the neighborhood of the medial crest. There are predisposing causes, such as prolonged rest, neurectomy, etc., while the exciting causes are concussions or traumatisms. The certain diagnosis can only be established by means of the Röntgen rays, for acute navicular disease and arthritis of the foot present the same symptoms as fracture of the navicular bone. Prognosis is always unfavorable,

and the lameness persists even in cases where the fracture is consolidated by a callus.

In twenty-five horses destroyed on account of incurable affections of the organs situated in the interior of the hoof, Bérrar found, upon postmortem examination, four fractures of the navicular bone.

The author advances interesting considerations concerning the genesis of these fractures, basing his arguments upon the function of the bone. The bone is compressed between the second phalanx and the perforans tendon; and all its interior structure is organized to support pressure. This structure resembles a collection of tubes or columns disposed perpendicularly to the two surfaces of pressure. The navicular bone is fixed at its two extremities by a rather complex ligamentous apparatus, and supported by the perforans tendon. Fractures supervene from excessive pressure transmitted by the second phalanx; and the perforans tendon, *which is relaxed in certain positions of the limb,* may not counteract such pressure sufficiently.—*Annales de Médecine Vétérinaire.*

DETOXICATED VACCINES.

THOMSON (D). *The Lancet* (London), March, 1919, p. 374.

Thomson has conducted extensive researches on the removal of the endotoxins from the gonococcus and other organisms in order to produce non-toxic vaccines which could be injected in sufficiently large doses to develop a great amount of immunity. The toxicity of most germs was successfully reduced some fifty to one hundred times. Thus, with ordinary gonococcal vaccine it was found necessary to begin in acute cases with doses not exceeding 5,000,000, and gradually to increase to about a maximum of 250,000,000. On the other hand, the same strains of gonococci, when detoxicated, could be administered in acute cases in doses of 2,500,000,000 and increased to 10,000,000,000. These large doses caused even less toxic symptoms than the small doses of the ordinary vaccine.

The therapeutic results obtained corresponded very markedly with the serologic tests. Thus it was found that the cases which showed the highest degree of immunity, as estimated by the complement-fixation test, recovered much more rapidly, and vice versa in those which showed a low degree of complement fixation, the disease ran a prolonged course.

The dose of 200,000,000 of ordinary gonococcal vaccine produced malaise and fever in the normal subject, whereas the symptoms arising from a dose of 5,000,000,000 of the detoxicated vaccine were scarcely noticeable, and no fever was induced. Experiments have been carried out with detoxicated vaccines for the prevention and treatment of bronchial and nasal catarrh, and the results so far have been very promising. Thomson says that the clinical evidence is increasingly convincing that this detoxication process will revolutionize the whole subject of vaccine treatment and preventive inoculations.

THROMBOSIS OF THE AORTA IN A MARE.

(Note sur un cas de thrombose de l'aorte postérieure chez une jument.) QUENTIN. *Rec. Méd. Vét.*, Vol. XCIV, Nos. 15-17, 15th August-15th September, 1918, pp. 414-415.

A thirteen-year-old mare, on returning to the stable after being shod, suddenly became lame with extension and rigidity of the hind limb. A few yards farther on, the animal fell suddenly. The expression was anxious, the eye staring, the nostrils contracted, the respiration accelerated, the conjunctiva a dark red, and the facial artery obviously distended. The trunk, shoulders, neck and face were hot and burning and covered with an abundant hot sweat. The hind limbs and the croup, on the contrary, were cold and dry. There were violent expulsive efforts, with protrusion of the clitoris and vaginal retropulsion. The animal groaned and even cried out.

The most important postmortem discovery, explanatory of the symptoms, was a dilation of the terminal part of the aorta, containing a thrombus which weighed 250 grammes. This was yellowish, composed of concentric layers, with a rounded anterior end, and prolongations from its posterior extremity into the external iliac and hypogastric arteries. In addition, the following lesions were found: A cyst of the right ovary as large as a turkey's egg; diffuse subacute nephritis (the right kidney weighed 830 grammes, and the left 1,200 grammes); and a certain degree of cardiac hypertrophy, more particularly of the left ventricle.—*Vet. Rev.*

Dr. John M. Hanrahan has recently returned from army service and has accepted a position with the state of Montana, with headquarters at Bozeman.

THE INTRADERMAL PALPEBRAL MALLEIN TEST.

(Observations relatives a l'intra-dermo-malléination palpébrale comme méthod de diagnostic de la morve.)

A. Louis and D. Lecompte. *Rev. Gén. Méd. Vét.*, Vol. XXVII, No. 320, August, 1918, pp. 361-368.

In discussing the diagnostic value of the intradermal palpebral mallein test, Drouin and Naudinat (Rev. Gén. Méd. Vét., 1914) drew attention to the possibility that œdema may be confined to the lower eyelid, with hardly any inflammation of the conjunctiva, and a limpid (not muco-purulent) discharge. They contended that such reactions should cause the horse to be considered as "suspect," and that, by way of control, the subcutaneous test should be applied. A ministerial circular, dated December 23, 1914, authorized the employment of the intradermal palpebral method of diagnosis, and indicated that an inconclusive reaction should be followed by the subcutaneous test.

In the present communication, Louis and Lecompte give particulars of a number of cases in which the palpebral test has given a doubtful or incomplete reaction in animals shown to be suffering from glanders by other methods of diagnosis. In one case the intrapalpebral injection of mallein never gave a clearly positive reaction, though positive evidence of the presence of glanders was afforded by the subcutaneous test, by intraperitoneal injection into male guinea pigs of material derived from closed lesions, and by serological tests. The postmortem examination confirmed the diagnosis.

All their observations, therefore, confirm the contention of Drouin and Naudinat and the instructions contained in the official circular: "Any animal presenting, thirty-six hours after injection, a more or less marked and persistent œdema confined to the lower eyelid, is to be held as 'suspect' until the diagnosis is controlled by the subcutaneous injection of mallein."—*Vet. Rev.*

After having served as meat inspector while in the army, Dr. H. T. Ludwig has accepted a position with the B. A. I., under Dr. J. S. Grove, at Oklahoma City, Oklahoma.

Dr. M. W. Meidigh has returned from Camp Meade, Maryland, to State College, Pennsylvania.

Lieutenant George A. Handley has been transferred from the Chicago post to Fort Meyer, Virginia.

ARMY VETERINARY SERVICE.

FROM THE OFFICE OF THE SURGEON GENERAL OF THE ARMY, WASHINGTON, D. C.

The following orders of transfer and reassignment of veterinary officers have been issued during the past month:

1. Major John R. Scully, V. C., is relieved from duty as The Veterinarian, A. R. D. No. 327, Ft. Sill, Oklahoma, upon the arrival of Captain James R. Mahaffy, V. C.

1. Captain Forest R. Harsh, V. C., from duty as Camp Veterinarian, Camp Wheeler, Ga., to Camp Shelby, Miss., for duty as Camp Veterinarian.

2. Captain John P. Divine, V. C., from Camp Dix, N. J., to Camp Mills, N. Y., for duty as the Camp Veterinarian.

3. Captain Harry R. Holmes, V. C., from Camp Sevier, S. C., to Camp Upton, N. Y., for duty as The Veterinarian.

4. Captain James R. Mahaffy, V. C., from duty as Zone Veterinarian, Eastern Purchasing Zone, Washington, D. C., to A. R. D. No. 327, Ft. Sill, Okla., for duty as The Veterinarian.

5. Captain Eugene J. Cramer, V. C., from Camp Wadsworth, S. C., to A. R. D. No. 320, Camp Custer, Mich., for duty as The Veterinarian.

1. 1st Lt. George S. Place, V. C., from A. R. D. No. 319, Camp Zachary Taylor, Ky., to Animal Embarkation Depot No. 301, Newport News, Va., for duty as The Veterinarian.

2. 1st Lt. Roy J. Hock, V. C., from A. R. D. No. 318, Camp Sherman, Ohio, to Philippine Department for duty.

3. 1st Lt. Herbert K. Moore, V. C., from Camp Wheeler, Ga., to Camp Lee, Va., for duty as Assistant to the Camp Veterinarian and Meat Inspector.

4. 1st Lt. Charles E. Richardson, V. C., from A. R. D. No. 306, Camp Greene, N. C., to A. R. D. No. 309, Camp McClellan, Ala., for duty.

5. 1st Lt. Francis DeSales Houston, V. C., from A. R. D. No. 314, Camp Beauregard, La., to A. R. D. No. 309, Camp McClellan, Ala, for duty.

6. 1st Lt. Roy R. Washer, V. C., from Camp Lee, Va., to Camp Knox, Ky., as Assistant to Camp Veterinarian and Meat Inspector.

7. 1st Lt. Frank C. Meisner, V. C., from Camp Knox, Ky., to Ft. McPherson, Ga., for duty as Post Veterinarian and Meat Inspector.

8. 1st Lt. Ralph B. Stewart, V. C., from Camp Jackson, S. C., to Ft. Leavenworth, Kans., for duty as Post Veterinarian and Meat Inspector.

9. 1st Lt. Wm. D. Faison, V. C., from duty as Veterinarian, 5th Cav., Ft. Bliss, Tex., to San Francisco, Calif., for duty as Transport Veterinarian on the U. S. Transport "Dix."

10. 1st Lt. Homer Johnson, V. C., from Camp Hancock, Ga., to Camp Custer, Mich., for duty as Assistant to the Camp Veterinarian and Meat Inspector.

11. 1st Lt. Robert S. Beattie, V. C., from A. R. D. No. 302, Charleston, S. C., to Ft. Bliss, Tex., for duty as Veterinarian with the 5th Cav. at that Post.

12. 1st Lt. Wm. R. Wolfe, V. C., from A. R. D. No. 329, Camp Travis, Tex., to A. R. D. No. 317, Camp Pike, Ark., for duty.

13. 1st Lt. Geo. A. Handley, V. C., from duty with the Zone Supply Officer, Chicago, Ill., to Ft. Myer, Va., for duty as Post Veterinarian.

14. 1st Lt. Edward M. Lynn, V. C., from duty with the Zone Supply Officer, Chicago, Ill., to Camp Pike, Ark., as Assistant to the Camp Veterinarian.

15. 1st Lt. Albert McGreevy, V. C., from duty with the Zone Supply Officer, Chicago, Ill., to Camp Travis, Tex., for duty as Assistant to the Camp Veterinarian.

16. 1st Lt. Ralph M. Ward, from duty from the Zone Supply Officer, Chicago, Ill., to Ft. Bliss, Tex., for duty as Assistant to the Camp Veterinarian.

1. 2nd Lt. Edward M. Juckniess, from A. R. D. No. 319, Camp Taylor, Ky., to Philippine Islands for duty.

2. 2nd Lt. Geo. W. Rawson, from A. R. D. No. 307, Camp Wadsworth, S. C., to A. R. D No. 311, Camp Wheeler, Ga., for duty.

3. 2nd Lt. Frank O. Brostrom, from A. R. D. No. 318, Camp Sherman, Ohio, to Philippine Department for duty.

4. 2nd Lt. Chauncy E. Moorman, from A. R. D. No. 313, Camp Shelby, Miss., to Ft. Sam Houston, Tex., for duty with the 14th Cav.

5. 2nd Lt. Harry I. Stanton, A. R. D. No. 314, Camp Beauregard, La., to A. R. D. No. 309, Camp McClellan, Ala., for duty.

6. 2nd Lt. Herbert M. Armstrong, at A. R. D. No. 318, Camp Sherman, Ohio, is, in addition to his other duties, assigned to duty with Field Remount Squadron No. 350, that Camp.

7. 2nd Lt. Ward C. Timblin, from F. R. S. No. 350, Camp Sherman, Ohio, to A. R. D. No. 318, Camp Sherman, Ohio, for duty.

8. 2nd Lt. Harry E. Mitchell, from A. R. D. No. 329, Camp Travis, Tex., to A. R. D. No. 317, Camp Pike, Ark., for duty.

9. 2nd Lt. James E. Masterson, from Camp Jackson, S. C., to Ft. Leavenworth, Kans., for duty as Veterinarian at the U. S. Disciplinary Barracks of that Post.

10. 2nd Lt. Frank R. Osborn, from A. R. D. No. 329, Camp Travis, Tex., to A. R. D. No. 317, Camp Pike, Ark.

11. 2nd Lt. Anthony J. Matter, from A. R. D. No. 326, Camp Cody, N. M., to Ft. Wingate, N. M., for duty as Post Veterinarian.

12. 2nd Lt. W. W. Utzmann, from A. R. D. No. 326, Camp Cody, N. M., to Ft. Ringgold, Tex., for duty with the 4th Cav.

13. 2nd Lt. Oscar W. Anderson, from duty with the Zone Supply Officer, Chicago, Ill., to Camp Sherman, Ohio, for duty as Assistant to the Camp Veterinarian.

14. 2nd Lt. Joseph T. Mahoney, from duty with the Zone Supply Officer, Chicago, Ill., to Camp Bowie, Tex., for duty as Assistant to the Camp Veterinarian.

15. 2nd Lt. Lester W. Thiele, from duty with the Zone Supply Officer, Chicago, Ill., to Camp Kearny, for duty as Assistant to the Camp Veterinarian.

16. 2nd Lt. Paul S. Christman, from Camp Wadsworth, S. C., to A. R. D. No. 307, Camp Wadsworth, S. C., for duty.

The following officers have been promoted to the grade of Captain for the period of the emergency to date from November 13, 1918. These officers are on duty with the American Expeditionary Forces, France:

1. 1st Lt. H. B. Balthazer.
2. 1st. Lt. I. L. Barstow.
3. 1st Lt. H. L. Blackburn.
4. 1st Lt. E. I. Cheely.
5. 1st Lt. Harold Clarke.
6. 1st Lt. W. M. Decker.
7. 1st Lt. G. L. Fallon.
8. 1st Lt. J. J. Essex.
9. 1st Lt. P. T. Gillie.
10. 1st Lt. G. W. Grim.
11. 1st Lt. H. H. Haigh.
12. 1st Lt. F. E. Jones.
13. 1st Lt. W. C. Keck.
14. 1st Lt. R. E. Kyner.
15. 1st Lt. C. J. McAnulty.
16. 1st Lt. R. B. McCord.
17. 1st Lt. H. C. McKim.
18. 1st Lt. N. S. Nutty.
19. 1st Lt. J. P. Porch.
20. 1st Lt. T. J. Quinn.
21. 1st Lt. G. T. Reaugh.
22. 1st Lt. D. S. Robertson.
23. 1st Lt. H. B. Roshon.
24. 1st Lt. R. W. Smith.
25. 1st Lt. Edwin Temple.
26. 1st Lt. J. R. Underwood.
27. 1st Lt. H. C. Vestal.
28. 1st Lt. A. C. Wight.
29. 1st Lt. F. F. Younglove.
30. 1st Lt. G. M. Zinkham.
31. 1st Lt. C. W. Likely.

The following officers have been promoted to the grade of Captain for the period of the emergency to date from February 17, 1919. These officers are on duty with the American Expeditionary Forces, France:

1. 1st Lt. C. R. Boshart.
2. 1st Lt. C. R. Farmer.
3. 1st Lt. C. L. Miller.
4. 1st Lt. W. C. Nickel.
5. 1st Lt. J. N. Shaw.
6. 1st Lt. O. J. Conzelman.
7. 1st Lt. P. H. Burnett.
8. 2nd Lt. C. S. Stirrett.

The following 2nd Lieutenants, V. R. C., were promoted to the grade of 1st Lieutenant, V. C., U. S. A., to rank from No-

vember 13, 1918. These officers are on duty with the American Expeditionary Forces, France:

1. 2nd Lt. B. C. Bridges.
2. 2nd Lt. L. J. Brown.
3. 2nd Lt. J. E. Butin.
4. 2nd Lt. M. L. Claflin.
5. 2nd Lt. A. W. Combs.
6. 2nd Lt. B. H. Dunkley.
7. 2nd Lt. M. C. Fritzwater.
8. 2nd Lt. C. T. Guilfoyle.
9. 2nd Lt. E. M. Hough.
10. 2nd Lt. W. M. McLeod.
11. 2nd Lt. O. O. Long.
12. 2nd Lt. L. A. Marshall.
13. 2nd Lt. C. S. Parker.
14. 2nd Lt. J. F. Rogers.
15. 2nd Lt. H. M. Savage.
16. 2nd Lt. Thomas Shields.
17. 2nd Lt. L. R. Smith.
18. 2nd Lt. J. T. Traylor.
19. 2nd Lt. W. L. Williamson.
20. 2nd Lt. E. W. Youngblood.

The following Captains have been honorably discharged from the Veterinary Corps, United States Army:

1. Captain C. R. Sandberg, who was on duty as The Veterinarian, A. R. D. No. 322, Camp Dodge, Iowa.
2. Captain A. H. F. Harmening, who was on meat inspection duty with the Zone Supply Officer, Chicago, Ill.
3. Captain Norris L. Townsend, who was on meat inspection duty with the Zone Supply Officer, Chicago, Ill.
4. Captain Thomas T. Rundle, who was on duty at the Veterinary Hospital, Camp Lee, Va.
5. Captain J. L. Wright, who was on duty as Camp Veterinarian, Camp Greene, N. C.
6. Captain P. H. Wallingford, who was on duty as Camp Veterinarian, Camp Humphreys, Va.
7. Captain Basil Bennett, who was on duty as The Veterinarian, A. R. D. No. 325, Camp Logan, Tex.
8. Captain Robert Graham, who was on duty as The Veterinarian at the Medical Department Laboratory, Ft. McPherson, Ga.
9. Captain Homer V. McCullah, who was on duty as the Camp Veterinarian, Camp Fremont, Calif.
10. Captain C. H. Carnahan, who was on duty as The Veterinarian, 13th Division, Camp Lewis, Wash.
11. Captain R. M. Hofferd, who has been on duty with the 92nd Division, A. E. F., returned to this country with that division and was discharged at Camp Upton, Long Island.
12. Captain R. A. Moye, who was on duty as Camp Veterinarian, Camp Sherman, Ohio.
13. Captain R. Porteuse, who was on duty as Camp Veterinarian, Camp Gordon, Ga.
14. Captain D. M. Hoyt, who was on duty as Camp Veterinarian, Camp Shelby, Miss.
15. Captain R. D. Chew, who was on duty as Camp Veterinarian, Camp Beauregard, La.

2nd Lieut. R. L. Conklin, V. C., Regular Army, resigned March 12, 1919.

Major A. R. Kincaid, U. S. A., who was on duty as the Division Veterinarian, 17th Division, Camp Beauregard, La., has been honorably discharged.

The following 1st Lieutenants have been discharged from the Veterinary Corps during the past month:

1. 1st Lt. G. M. Smith.
2. 1st Lt. Rosser Lane.
3. 1st Lt. John Doerr.
4. 1st Lt. Edgar E. Williams.
5. 1st Lt. F. R. McNabb.
6. 1st Lt. G. W. Lies.
7. 1st Lt. Arnold J. Thompson.
8. 1st Lt. J. B. Barnes.
9. 1st Lt. E. J. Laing.
10. 1st Lt. W. F. Dixon.
11. 1st Lt. A. D. Kendrick.
12. 1st Lt. J. D. Corson.
13. 1st Lt. C. T. Dooley.
14. 1st Lt. G. J. Kigler.
15. 1st Lt. F. W. Heuben.
16. 1st Lt. C. P. Lamb.
17. 1st Lt. B. B. Flowe.
18. 1st Lt. R. D. Miller.
19. 1st Lt. R. D. Lorton.
20. 1st Lt. M. H. Hilman.
21. 1st Lt. S. M. Langford.
22. 1st Lt. O. C. Kackley.
23. 1st Lt. J. E. Syferd.
24. 1st Lt. F. W. Bratten.
25. 1st Lt. G. W. Hamilton.
26. 1st Lt. R. M. Thomas.
27. 1st Lt. E. S. Markham.
28. 1st Lt. M. L. Claflin.
29. 1st Lt. A. M. Combs.

The following 2nd Lieutenants have been discharged from the Veterinary Corps during the past month:

1. 2nd Lt. L. R. Montgomery.
2. 2nd Lt. R. F. Gard.
3. 2nd Lt. Julian Lyon.
4. 2nd Lt. E. L. Foos.
5. 2nd Lt. W. C. Bateman.
6. 2nd Lt. A. Sanders, Jr.
7. 2nd Lt. W. H. Roeschlein.
8. 2nd Lt. D. K. Williams.
9. 2nd Lt. Wm. G. Warren.
10. 2nd Lt. E. C. Hicks.
11. 2nd Lt. H. A. Milo.
12. 2nd Lt. G. B. Shinn.
13. 2nd Lt. O. H. Trout.
14. 2nd Lt. L. H. Mathers.
15. 2nd Lt. J. R. Wiley.
16. 2nd Lt. F. P. Murphy.
17. 2nd Lt. Wm. M. Long.
18. 2nd Lt. R. E. Duckworth.
19. 2nd Lt. Irving Moles.
20. 2nd Lt. M. W. Neidigh.
21. 2nd Lt. F. F. Buck.
22. 2nd Lt. P. H. Egan.
23. 2nd Lt. C. McH. Greer.
24. 2nd Lt. C. J. Simmons.
25. 2nd Lt. Cecil Elder.
26. 2nd Lt. R. W. Broadhurst.
27. 2nd Lt. C. M. Lutz.
28. 2nd Lt. O. A. Cook.
29. 2nd Lt. L. J. Hinson.
30. 2nd Lt. M. P. Fuller.
31. 2nd Lt. J. F. Lineberger.
32. 2nd Lt. I. H. Arnold.
33. 2nd Lt. M. A. Quinn.
34. 2nd Lt. Wm. T. Pittinger.
35. 2nd Lt. Henry G. Smith.
36. 2nd Lt. F. L. Cissell.
37. 2nd Lt. E. P. Anderson.
38. 2nd Lt. C. E. Blosdale.
39. 2nd Lt. P. L. Matthews.
40. 2nd Lt. V. A. Holby.
41. 2nd Lt. F. S. Klein.
42. 2nd Lt. C. E. Wicktor.
43. 2nd Lt. R. G. Menefee.
44. 2nd Lt. S. A. Schneidman.
45. 2nd Lt. W. M. Henry.
46. 2nd Lt. Michael Shiply.
47. 2nd Lt. J. O. Ashley.
48. 2nd Lt. A. J. Allott.
49. 2nd Lt. D. L. Cecil.
50. 2nd Lt. H. A. Chapin.

51. 2nd Lt. George Wessels.
52. 2nd Lt. W. B. Hirleman.
53. 2nd Lt. C. B. Emerick.
54. 2nd Lt. S. D. Cronk.
55. 2nd Lt. H. F. Dailey.
56. 2nd Lt. T. S. Williams.
57. 2nd Lt. F. W. Beck.
58. 2nd Lt. S. R. Poulter.
59. 2nd Lt. J. C. Mitten.
60. 2nd Lt. F. F. Dowd.
61. 2nd Lt. E. J. Yocom.
62. 2nd Lt. M. L. Plumer.
63. 2nd Lt. H. E. Van Der Veen
64. 2nd Lt. E. B. Oliver.
65. 2nd Lt. D. D. Dragoo.
66. 2nd Lt. J. J. Glover.
67. 2nd Lt. L. P. Sharp.
68. 2nd Lt. F. J. Trafton.
69. 2nd Lt. W. T. Vilott.
70. 2nd Lt. M. L. Hutchins.
71. 2nd Lt. E. E. Brosnan.
72. 2nd Lt. O. N. Schultz.

Lieutenant Colonel Gerald E. Griffin, U. S. A., has been relieved from duty at Ft. Myer, Va., and directed to proceed to Atlanta, Ga., and take station at that place. He will act as General Veterinary Inspector in the following territory: Tennessee, New Orleans, Louisiana, Mississippi, Alabama, Georgia, Florida, North Carolina and South Carolina. Major R. M. Staley, U.S.A., now General Veterinary Inspector for that territory, will be relieved from duty on the arrival of Lieutenant Colonel Griffin and will proceed to Washington, D. C., and report to the Surgeon General for duty. Major Staley contemplates an early return to civil life.

The duties of the General Veterinary Inspector for this district may be briefly summarized as follows:

(a) To coöperate with the Bureau of Animal Industry in the disinfection of public stables, yards and stock lines used in the transportation and collection of animals for or in the military service.

(b) Inspecting and reporting upon: The sanitary condition of yards, depots, veterinary hospitals, horse lines and stables, etc., in his territory belonging to or used by the War Department and not under the control of the Department Commander, the methods used in handling animals therein, the efficiency of veterinary officers and upon such other offices that have a direct bearing on the Veterinary Service or on the prevention of disease and inefficiency of animals.

VETERINARY ENLISTED PERSONNEL, MEDICAL DEPARTMENT.

The General Staff have recognized that the Veterinary Corps, Regular Army, must have an enlisted personnel.

The reorganization plans for the Regular Army call for an enlisted Veterinary Corps personnel in the Medical Department. To determine the number of men necessary a ratio of forty enlisted men for each thousand authorized public animals has been used as a basis. The grades for this personnel will be similar to those now in the Medical Department, so that the Veterinary Corps men will have the same opportunities for advancement as men of other branches of the service.

Authority for the enlistment of men for the Veterinary Corps, Regular Army, was published in the following circular:

War Department,
Circular No. 141. Washington, March 24, 1919.

INSTRUCTIONS GOVERNING VOLUNTARY ENLISTMENT, AMENDMENT TO CIRCULAR NO. 113, WAR DEPARTMENT, 1919.

Paragraph 5, Circular No. 113, War Department, 1919, is rescinded and the following is substituted therefor:

5. Enlistment of men for certain special services. Extract:

Men who desire to enlist or reënlist in the Veterinary Corps or Dental Corps will be enlisted for the Medical Department and will be transferred immediately to the Veterinary Corps or Dental Corps, respectively, for assignment in accordance with the provisions of Circular No. 101, War Department, 1919.

(342, A. G. O.)

By order of the Secretary of War:

FRANK MCINTYRE,
Major General, Acting Chief of Staff.

FIRST ENLISTMENT, VETERINARY CORPS, REGULARY ARMY.

On March 26, 1919, two days after the authority for enlistments was published, Gabriel A. Wright enlisted at Camp Sherman, Ohio.

All Veterinary Detachment Commanders were immediately notified of this provision for an enlisted Veterinary Corps personnel in the Regular Army. It is hoped that the Corps will be able to obtain a considerable number of men by voluntary enlistment. All enlistments are for the grade of private, but provision is made for promotion of those capable of performing the duties required of the grades. There are two enlistment periods authorized at present. For those who have had previous service they may enlist for either one or three years, while men without previous service will have to enlist for three years. Besides service in the United States, men will be required for duty with the American Expeditionary Forces, France, in Panama, Hawaii, Philippine Islands and China. An unusual opportunity is hereby offered for travel in foreign lands. It will probably be necessary for men who desire overseas service to enlist for three years. Men qualified as clerks, typists, stenographers, pharmacists, cooks, horseshoers, teamsters and stablemen will be needed.

Besides the opportunity for travel this service will offer training to men in horseshoeing, veterinary first aid, care and handling of animals, feeds and feeding, inspection of meat and milk products and horsemastership.

A VETERINARY ARTIST.

A real artist has been discovered in the person of 2nd Lieut. Horst Schreck, V. C., U. S. A. Lieut. Schreck has been on duty at Auxiliary Remount Depot No. 303, Camp Dix, New Jersey. While there he made some excellent paintings and pen and ink drawings of pathological conditions. His work has been pronounced as exceptionally accurate and realistic. Lieut. Schreck is now on duty at the Auxiliary Remount Depot, Camp Hancock, Georgia, and is devoting his time to the making of paintings and drawings of cases of dermatitis gangrenosa in the various stages of the disease An accurate clinical history will be kept to accompany the drawings. It is expected that the Veterinary Corps will be able to obtain some very valuable data in regard to this disease, which has been prevalent in some of the Remount Depots, and will be able to present to the veterinary profession original work along this line which will be of great scientific value.

OFFICERS, VETERINARY CORPS, UNITED STATES ARMY.

	On Duty November 11, 1918.	On Duty April 11, 1919.
Colonels	1	0
Lieutenant Colonels	3	2
Majors	78	78
Captains	205	182
First Lieutenants	681	487
Second Lieutenants	1,216	555
	2,184	1,304

RANK, PAY AND ALLOWANCES FOR VETERINARIANS.

On August 20, 1918, the Comptroller approved the Auditor's decision that there was no authority for the appointment or promotion of a veterinarian now in the Army as defined by par. 4, Sec. 16, National Defense Act, June 3, 1916, to the grade of Major, Veterinary Corps.

On October 9, 1918, the Comptroller ruled that the Selective Service Act of May 18, 1917, did not authorize the appointment in the temporary forces raised thereunder of colonels, lieutenant colonels and majors in the Veterinary Corps.

On December 6, 1918, the Auditor ruled that there was no authority for the promotion of veterinary officers except as provided in Sec. 16, National Defense Act, June 3, 1916, which requires five years' service to a first lieutenancy, etc.

From the time the first opinion was received at the Surgeon General's office until a final decision was rendered by the Comptroller, the Director of the Veterinary Corps has been untiring in his efforts to have these opinions reversed and consequently

secure for the officers of the Veterinary Corps their just status. It is a source of great satisfaction to be able to report the success of these efforts.

On April 9, 1919, the Comptroller rendered a decision which reverses the ones above referred to. The grade of Major in the Veterinary Corps, Regular Army, under the National Defense Act of June 3, 1916, for veterinarians now in the Army after twenty years' service is held to be authorized. Payments made or to be made to men commissioned in the Veterinary Corps as colonels, lieutenant colonels, majors, captains, first lieutenants and second lieutenants will not be disturbed by the accounting officers if correctly made in other respects.

It is expected that prompt action will be taken by the War Department to restore the grade of major for the Veterinary Corps in the Regular Army.

Major Albert N. Towner of the Army Veterinary Corps with the A. E. F. is now Area Veterinarian of the American embarkation center.

Major H. F. Steele of the regular army veterinary service and who for more than a year has been in the war zone in France has recently returned to this country and sent to the White Plains, New York, Sanitorium to recover from an attack of laryngitis that made him voiceless for many weeks. While in New York City he visited his Alma Mater.

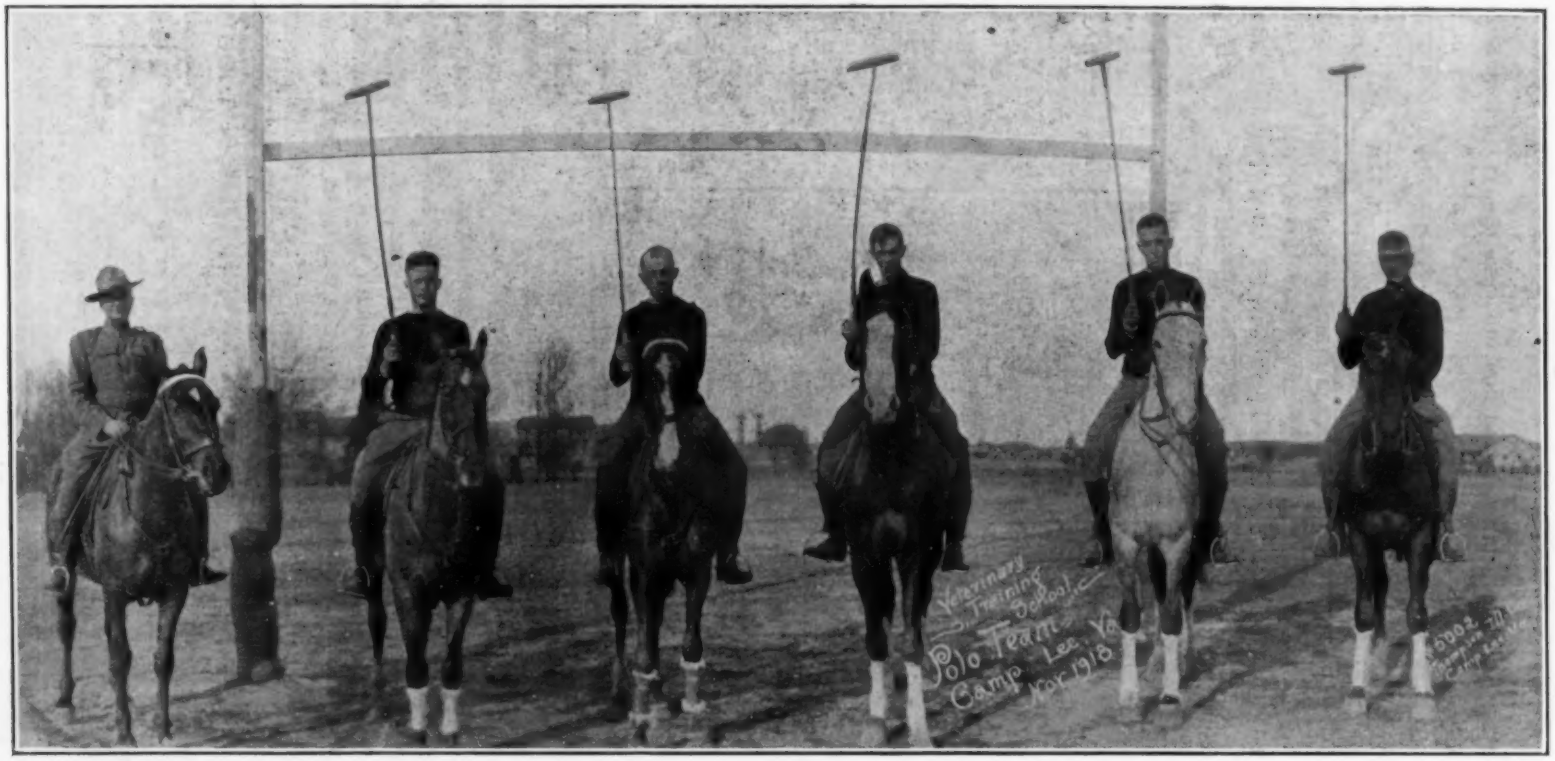
Captain O. E. McKim of New York, who, after an unusual experience as veterinarian to the allied horse shipping service, entered the U. S. Army Veterinary Corps in France, has just recovered from an attack of lobar pneumonia in Germany following the armistice. At all times in the war zone he daily reported for duty in the service until after November 11, 1918. Captain McKim lectured on army veterinary service at the New York State Veterinary College in New York City before going abroad.

Major E. B. Ackerman of Brooklyn, recently located at Camp McClellan, Alabama, after very successful work at Camp Greene, North Carolina, has been released from the service and will resume practice in the metropolitan district.

Captain R. A. Mullings, formerly stationed at Jersey City, in charge of that division of the B. A. I., and who entered the Army Veterinary Service and was placed in charge of army meat inspection in the eastern division, will shortly leave the Army Veterinary Service to accept a position of larger service with one of the "big five."

POLO TEAM OF VETERINARY TRAINING SCHOOL, CAMP LEE, VA.

Believed to Be the First Polo Team Ever Organized in the United States Composed Entirely of Veterinarians.



From left to right: Lieut Col. Griffin, instructor; Captain Smith, captain of the team; Captain Haring, Captain Hardenbergh, Captain Mackie.

ASSOCIATION NEWS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

NEW ORLEANS AND THE A. V. M. A.

In only a few months after this page sees the light thousands of veterinarians will be hurrying from their homes to various ticket offices to inquire about accommodations from "Somewhere in America" to New Orleans, Louisiana. It will be simple for the railroad agent to advise you, because so many of the great arteries of transportation lead direct to the "Winter Capital of America."

GRUNEWALD HOTEL, NEW ORLEANS.
Headquarters 56th Annual Meeting A. V. M. A.

The nearest the A. V. M. A. has ever come to the southern section was twenty-two years ago, when it visited Nashville, Tennessee. Since that time many changes have been made on the map and hundreds of students have chosen to enter the veterinary profession, all of which has brought "Dixie Land" into keen competition with other sections of the country.

The Crescent City is looking for you and when you arrive outstretched arms will welcome you into the gates of a different

atmosphere of social life, so saturated with a blend of southern hospitality and French manners, the memory of which will linger with you long after the convention has been forgotten. Historically, New Orleans is the most interesting city in America, with the Creole quarter of French and Spanish romance and the American quarter, a great modern metropolitan center throbbing with business, its massive steel and stone structures reaching upwards toward the sky line.

If you are yearning for a journey abroad and cannot make your desires mature, just consider and supplement it with a trip this fall to the A. V. M. A. from November 17 to 21, inclusive, and the famous restaurants of the city will maintain their splendid reputations, offering with pride to their guests the same French, Italian, Latin-American and other high-class cuisine that each nation daily serves to its countrymen.

The fifty-sixth annual meeting will be held on the twelfth floor in the auditorium of the Grunewald Hotel. The hall is large, light and twelve stories from the street, so the traffic will not disturb the execution of the program. On a separate page will be seen a picture of headquarters which should not fail to attract the most fastidious. Other magnificent hotels are the St. Charles, Monteleone, DeSoto, Lafayette, Cosmopolitan, Planters', and the Inn. Commercial houses desiring space for exhibition purposes should communicate early with the management of the Grunewald for reservation and prices, and signify a willingness to use the same space for sleeping quarters, with the understanding that assignment be made accordingly, on the twelfth floor, convenient and accessible to all in attendance.

From all appearances, this will be one of the largest and most important meetings ever held; notably because it is scheduled for New Orleans, which never fails to command attention when on the itinerary of the average tourist. Therefore, those anticipating the trip should plan for reservation months in advance, for choked European traffic has turned loose a mass of sightseeing Americans to discover new things at home, and many of them will be departing from a colder climate to various southern points, particularly New Orleans, because of the early approach of the racing season.

The time of year selected is the most beautiful and delightful of all. The hot summertime will be gone and the air will be tempered with the cool breezes from the great gulf, which is only about one hundred miles distant, where the Father of Waters

empties its volume into the sea. Come to the meeting—bring new members and persuade your friends to accompany you. Bring cool suits for warm, pleasant days and a medium-weight for evenings and sudden changes. Like all semi-tropical areas, frequent changes in the weather may be expected. However, there need be no particular inconvenience if one only uses a little judgment and comes accordingly.

The ladies, as usual, are extended a cordial invitation to attend and we, in Louisiana, strongly insist that they make this occasion one of their most important social functions of the season. The committee will provide pleasing and cheerful entertainments, full of splendor and action, certain to meet with the approval of the most discriminating. A convention without the ladies would be lacking in character, culture and refinement, all of which go to broaden our vision and promote a spirit of kindly feeling toward all. Doctors, bring your wives and daughters! And wives and daughters, prepare now for one of the best times in all your lives.

The Louisiana Veterinary Medical Association through its officers is doing everything possible to make the occasion a complete success, to the end that we hope no one will leave disappointed, but, on the other hand, wish to linger a little longer, and as the train slowly departs, firmly resolve to hurry back to the land of the golden sunset.—E. I. SMITH, Secretary-Treasurer and Chairman Arrangements, Louisiana Veterinary Medical Association.

TO APPOINT DELEGATES TO NEW ORLEANS.

Responding to invitations from President Moore of the American Veterinary Medical Association and Dr. E. P. Flower, president of the Louisiana Veterinary Medical Association, the Louisiana State Medical Society, recently in annual session at Shreveport, Louisiana, unanimously passed a resolution providing for the appointment of one delegate and one alternate from each congressional district of the state to attend the annual meeting, in New Orleans, of the American Veterinary Medical Association.

Captain J. A. McKinnon, formerly located at Manila, Philippine Islands, is now in Siberia. He has been appointed Chief Veterinarian of the American Expeditionary Forces.

Captain O. C. Selby has returned from Camp Meade, Maryland, to his home in Worthington, Minnesota.

OTHER ASSOCIATIONS

LOUISIANA VETERINARY MEDICAL ASSOCIATION.

Dr. E. Pegram Flower, president of the Louisiana Veterinary Medical Association, has appointed the following committee of arrangements in connection with the next meeting of the American Veterinary Medical Association to be held in New Orleans from November 17 to November 21, inclusive:

Dr. E. I. Smith, chairman, Baton Rouge, La.
Mr. Thomas J. Hill, Association of Commerce, New Orleans.
Dr. W. H. Dalrymple, Baton Rouge, La.
Dr. R. W. Tuck, New Orleans, La.
Dr. E. P. Flower, Baton Rouge, La.
Dr. A. W. Vornheder, New Orleans, La.
Dr. J. Arthur Goodwin, New Iberia, La.
Dr. J. R. Upton, Baton Rouge, La.
Dr. F. J. Cambon, New Orleans, La.

The above committee will do everything possible to make the convention a colossal success and the chairman invites suggestions and will be at the command of the association from now until the end of the session.

E. I. S.,
Secretary-Treasurer.

MAINE VETERINARY MEDICAL ASSOCIATION.

At the January meeting of the Maine Veterinary Medical Association, held at Augusta, Maine, the congratulations of the members were extended to Dr. A. L. Murch of Bangor, Maine, on his recent election to the Legislature.

E. E. Russell, Secretary.

VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY.

The regular monthly meeting of the Veterinary Medical Association of New York City was held in the lecture room of Carnegie laboratory, 338 East Twenty-sixth Street, Wednesday evening, March 5, at 8:30 o'clock, President Cochran in the chair.

The minutes of the February meeting were read and approved.

Dr. Thomas B. Rogers, Woodbury, New Jersey, gave an instructive address on "A New Pharmacopæia," or a veterinary section in the new U. S. Pharmacopæia, which will be adopted in 1920. Dr. Rogers gave important reasons for the necessity of this veterinary section in the U. S. P. Amongst others, he mentioned the large number of preparations necessary for the larger animals, as, for example, the equine veterinary blister and the aloetic physic ball. The smaller animals also need a number of special preparations other than those listed in the U. S. Pharmacopæia.

The Doctor advocated the more general use of the acetic acid extracts in veterinary practice, stating that in his experience they were just as effective as the alcoholic extracts and also stating that the doses should be slightly larger. He advocated the appointment of a veterinary delegate on the revision committee of the U. S. Pharmacopæia.

Discussion.—Dr. Hoskins said that a committee of the American Veterinary Medical Association had been appointed to take up this work at the Philadelphia meeting. Dr. Ellis mentioned the cloudy appearance the acetic acid extracts gave when mixed with water as one of his objections to them and that he did not think they were quite as active as the alcoholic extracts. Dr. DeVine said he had used the acetic acid nux vomica for a number of years with good results. Dr. Rogers asked the Secretary to read a letter he received from Charles A. LaWall, asking that a veterinarian be appointed on the revision committee of the U. S. P. This letter was referred to Dean Hoskins, who will communicate with the President of the American Veterinary Medical Association.

On the question box being opened the following question was asked, "Are the serums and bacterins of any real value in the prevention and treatment of canine distemper?" This subject furnished material for an interesting discussion entered into by Drs. Ellis, Millar, Crawford, Rogers and DeVine, Dr. Gannett also intervening to report that the Boston terrier bitch from which he removed the ovaries and uterus had made a good recovery. The concensus of opinion was that the sero-bacterins have their value if practitioners know how to use them.

The President then called on Lieutenant McTammany, lately returned from France, to say a few words on his army experiences. The Lieutenant gave the members a genuine treat in relating his sixteen months of army life in France. He said he

had been under fire on four different fronts and that he had met only two persons in France whom he had known before going across, one of them being our old colleague Major C. Clayton. He also gave an amusing account of his experiences getting into and out of the various hospitals in France which was very much enjoyed by all present.

The proposed amendment to the by-laws was taken up for discussion. This amendment, by a majority vote, was tabled.

Dr. W. I. McKinney, chairman of the committee on smoker, said that on account of the high prices of food and entertainment, etc., the tickets to the smoker would cost about $4.00 and that he did not think the committee was warranted to go ahead and make arrangements on that basis. It was regularly moved, seconded and carried that the motion to hold a smoker be reconsidered.

Dr. Ellis, chairman on twenty-fifth anniversary committee, said that as our alumni dinner and reunion would come in June he thought it would be better to postpone the twenty-fifth anniversary of the association celebration until our first meeting in the fall. Dr. Thomas E. Smith moved that we hold a social function to celebrate the twenty-fifth anniversary of the association sometime during the month of October. Seconded and carried.

Dr. McKinney, reporting for the board of censors, recommended that Dr. I. I. Curren be dropped from the roll. It was moved, seconded and carried that the recommendation of the board of censors in this case be adopted and that Dr. I. I. Curren be hereby dropped from the roll of membership in this association.

Dr. Harry Ticehurst, Morsemere, New Jersey, Dr. Isaac Wertheimer, 42 Bushwick Place, Brooklyn, and Dr. George C. Bowen, New Hyde Park, Long Island, were unanimously elected to membership in the association.

Dean Hoskins, chairman of the legislative committee, reported progress in the Carroll bill. Dean Hoskins mentioned the introduction of several new bils in the Legislature of importance to the veterinary profession, among them a bill to extend the tuberculin test so that owners of dairies may employ any veterinarian to test their cattle and make no report to the department of agriculture necessary, and that owners have the right to sell their reacting animals where they choose.

Another bill has been introduced increasing the tax on bitches from $3 to $10 a year. Dean Hoskins spoke at some length on the injustice of this tax on dog owners and of the immense sums the state was collecting from dog taxes, $900,000 in this state in the past two years, without giving anything adequate in return to the sheep industry, for which these taxes were originally intended, to build up the sheep industry.

Drs. Gannett, Smith, Rogers and DeVine also spoke on this proposed legislation.

No further business appearing, the meeting adjourned.

J. E. CRAWFORD, Secretary.

NATIONAL ASSOCIATION OF BUREAU OF ANIMAL INDUSTRY VETERINARIANS.

The semi-annual dues (per capita tax) of all members of this association for the term of six months ending August 31, 1919, are now due at the rate of $1.50 for each member. In this connection I respectfully quote the following extracts from our national constitution as adopted at the Philadelphia convention:

Art. 5, Sec. 2. The representation of any association at the national convention shall be based on the average amount of per capita tax paid by that association during the fiscal year.

Art. 10, Sec. 1. The fiscal year of this body shall begin on September 1 and end on August 31.

Art. 10, Sec. 2. The per capita tax to cover the expenses of this association shall be $3.00 per annum and shall be collected from all active members by the state, divisional and district associations, and by them remitted to the national secretary. Members-at-large shall remit per capita tax direct to the national secretary. This tax may be paid semi-annually.

All drafts, exchanges, postoffice or express money orders should be made payable to Dr. S. J. Walkley, Secretary, 185 Northwestern Avenue, Milwaukee, Wisconsin.

Some of our subordinate associations have previously remitted per capita tax for their entire membership for the year ending August 31, 1919, and other associations have remitted for a portion of their members for that period. This call is issued for the benefit of those members, only, whose per capita tax for the period ending August 31, 1919, remains unpaid.

The Bureau veterinarians deserve much credit for the liberal response made to the appeal for donations of two days' pay and an itemized statement of the contributions will be published later, showing the amount of each contribution. A large majority of those donating have given basic salary plus the temporary bonus and in some cases the donations have been in excess of those salaries.

It is of paramount importance that we have as nearly 100 per cent membership as possible and it should be borne in mind that contributing to the legislative fund does not constitute membership in the association. The per capita tax or membership fund and the legislative fund are separate and distinct.

Zone vice presidents and district organizezrs are urged to continue their efforts for a greater membership so that we may be prepared for some real teamwork in launching an intensive drive on a moment's notice. Our committee on legislation and publicity will keep the membership advised regarding developments in connection with legislation in which our association is interested.

On February 18, 1919, Dr. J. S. Koen of Des Moines, Iowa, resigned as our national president on account of leaving the Bureau service to accept more lucrative employment. Under the provisions of Art. 8, Sec. 2, of our national constitution, the vice president at large thereupon assumed the duties of the president. Hence, all correspondence for the office of our national president should be addressed to Dr. Frank P. St. Clair, Federal Building, South Side Station, Omaha, Nebraska. This leaves the office of vice president at large vacant and the present indications are that it shall remain vacant until the time of our next national convention.

Dr. Frank R. Jones of Fort Worth, Texas, has resigned as a member of our committee on legislation and publicity, on account of leaving the Bureau service to enter a more promising field in the commercial world, and Dr. O. B. Hess, in charge, office of hog cholera control, Washington, D. C., was appointed by former President Koen to fill the resulting vacancy on our committee of legislation and publicity. S. J. WALKLEY, Secretary.

March 24, 1919.

ASSOCIATION OF STATE AND PROVINCIAL VETERINARY COLLEGES.

REPORTS OF COMMITTEES.

COMMITTEE ON METHODS OF TEACHING SERUM THERAPY.

It is the experience of those offering courses in bacteriology and in serum therapy and immunity that the veterinary student is capable of undertaking such courses earlier than students in other fields. This is due to the fact that the supporting subjects in the veterinary curriculum furnish a better basis for laboratory

work in these subjects than do the supporting subjects in other courses. The course in immunity and serum therapy should be preceded by a thorough and complete lecture and laboratory course in general and pathogenic bacteriology, together with the fundamental discussion of theories of immunity. This should be offered not earlier than the sophomore year, and should not be followed immediately by the course in serum therapy and immunity. The latter should be given not earlier than the first semester of the senior year, preferably the last. In the interim the student will have had his courses in pathology, chemistry, physiology and medicine and will be better able to undertake the study of immunity and serum therapy. This subject presents intricate reasoning and phenomena of great complexity and a true insight into it can be obtained only through great labor. With Dr. Zinsser, we believe that it is a poor plan to attempt too extensively to simplify the material or to make an A B C of immunity as a quick road to comprehension. The self-satisfaction which comes to the student who masters the principles of immunity well repays him for the effort required. After mastering these principles, the concepts of the subject are relatively simple. The subject must be treated critically and the data which are accepted as fact must be separated from those upon which there are well-founded differences of opinion.

The course should include a thorough lecture and recitation course of at least thirty-six hours covering the work given in such standard texts on immunity as Zinsser, Kolmer or Simon.

This should begin with the discussion of infection and the problem of virulence. Too much emphasis cannot be laid on this important phase of the problem. The student must be able to understand that pathogenic bacteria possess defensive powers against the defensive forces of the body and are capable of utilizing these to overcome body resistance, thus making infection possible.

The types of immunity should be thoroughly discussed and the student should have well fixed in his mind what these are and how they are brought about. The action of the toxins and the theory of antitoxin production, as advanced by Ehrlich, must be thoroughly understood by the student and until he has such knowledge he should not be permitted to take up the study of the second and third order, antibodies, since only by clear conception of antitoxin production can he be expected to master the theories of the development of the more complex antibodies.

The practical and commercial methods of antitoxin production should be presented to the student, and in his laboratory course he should be permitted to put into practice the methods learned in the text-book, by actual production of some antitoxin, such as diphtheria or ricin. The phenomena of agglutination and precipitation, both in theory and in practical application as diagnostic means, should be mastered by the student. The practical application is to be brought out by laboratory demonstration and exercises carried on in the laboratory course. The bactericidal properties of blood serum, cytolysis and sensitization demand painstaking study. The nature and action of complement and amboceptor and the relationship of these two to antigens are to be brought out by discussion and by laboratory practice with the complement fixation and related tests. Ability to conduct a Wasserman test should be one requisite of the laboratory course. Phagocytosis and chemotoxis and the relation of these to immunity should be clear to the student. In the laboratory he should demonstrate the action of opsonins by the Wright method and should supplement this by the actual preparation of autogenous bacterins for some pyogenic infection and should follow up this work in clinic by the administration of these bacterins to a case under his observation.

The fundamental facts of anaphylaxis, together with theoretical consideration of the same, with particular emphasis laid on the relationship of anaphylaxis to infectious disease and the bearing it has on problems of infectious disease and the clinical significance of anaphylaxis merit considerable time spent on the study of this phenomenon. The course is to be rounded off by consideration of the therapeutic immunization of animals for different diseases and by discussion and interpretation of the allergic reactions.

Give the student such a course and it will not leave him an easy prey to the unscrupulous or grasping commercial man. Our courses in immunity and pathogenic bacteriology should not leave the student a menace to himself and the community through an ignorance of proper and sufficient knowledge of a very profound subject, making him untrustworthy in his diagnosis and in his prophylactic and therapeutic efforts and especially in his practice of this phase of medicine and interpretation of the related phenomena, nor, on the other hand, should it leave him pessimistic and hypercritical in regard to the true value of serum diagnostic methods and allergic tests often improperly

interpreted, or of the effectiveness of or the proper indications for serums and vaccines which science and practice have established. He should be influenced by his training to experiment judiciously, on the one hand, and, on the other, not to injudiciously utilize methods or materials under the guise of experimentation, as is frequently the case in veterinary practice, which is nothing more nor less than malpractice.

CHAS. MURRAY,
L. W. GOSS,
WARD GILTNER,
Committee.

REPORT OF COMMITTEE ON ENTRANCE REQUIREMENTS.

This association was organized to consider and encourage primarily higher standards of veterinary education, of which preliminary education is a very important part. Undoubtedly, the question as to the proper degree of education a prospective veterinary student should have attained before being permitted to enroll in a veterinary college will always be more or less debatable. Even if all veterinary colleges were on a uniform basis of fifteen units of high school work as an entrance requirement, we should soon be debating the question as to whether further increases in this standard should not be considered. That, however, is a question for the future and undoubtedly our present attention should be centered upon the creation of a uniform standard of fifteen units of high school work as a requirement of all veterinary colleges in this country.

In considering entrance requirements there usually are two opinions prevalent among veterinarians and teachers: One is that we should begin our professional education at a point where the high schools complete their work; the other contention is that we should require the minimum amount of preliminary education which is rather indefinite but usually the smallest amount that can be required and still the school receive recognition at the hands of the Bureau of Animal Industry and at the present time in the Surgeon General's office. In advocating the higher entrance requirements we should be guided by three principal factors: First, is the requirement reasonable and can and will it be met by a competent and desirable class of young men; second, is it the proper thing to do so far as the welfare of the live stock industry is concerned, and, third, is it best for the veter-

inary profession itself and the professions with which we must associate?

In answer to the first question we need but take the records of veterinary colleges which have gone from eighth grade requirements to the fifteen high school unit standard. In brief, the figures indicate in all cases that there is a temporary decrease in enrollment, but that within a few years' time the enrollment reaches the former figure and, in most cases, exceeds it. Thus any contention that the high school requirements would not enable the colleges to supply the requisite number of veterinarians for our country is without foundation.

In answering the second question, experience will also be a valuable assistant. Some adherents to a low standard requirement would have us believe that, so far as veterinary education is concerned, there are two distinct types of young men, one who is a practical, hard-working young man who has the qualities which enable one to make good under a handicap, and the other one with education, not accustomed to work and without any practical inclination. We can rest assured that these young men all belong to one and the same class, and the only difference is that one class has had greater educational facilities and thus has the advantage in training and mental discipline which enables him to assimilate and use to a much greater advantage the education that is offered in a professional school. Upon graduation such men are of much greater service to the stock man, state and nation, as well as living a larger and more beneficial professional life.

The third question as to which standard is best for the veterinary profession itself and its relation to other professions is one that depends upon the opinion of those whom the profession serves and upon the character of the young men entering the profession, as well as the confidence and respect shown them by our sister professions. Some would have us believe that a successful veterinarian should be one who is a combination of a horse jockey, a cow puncher and a person that knows a little about medicine. Such a person cannot be accepted as a professional man by any other profession, nor by the veterinary profession itself, if it desires to have the confidence and respect of an enlightened public. If a thorough preliminary education makes a student impractical and develops a dislike for the kind of work that the members of our profession are required to do, no such cases have been brought to our attention.

It has been observed, however, that more thoroughly educated men do their work in such a way as to place it on a skilled and technical basis and to remove it from the realms of empiricism. So great has been the improvement in the students and graduates of some state institutions that most of the faculty members would prefer to enter into some other line of work than to attempt to instruct a group of half-educated students.

It has been suggested that the amendment offered at Kansas City prescribing fifteen units of high school work for entrance as one of the regulations provided by the A. V. M. A. should be modified to conform with the ruling of the Surgeon General "and thus establish once and for all the policy of the American Veterinary Medical Association." This suggestion is not different from past suggestions because it simply recommends that we adopt the least possible requirement and get recognition at the hands of the government. It is doubtful whether the Surgeon General or the Bureau of Animal Industry cares to be put into the position of dictating the entrance requirements for all the colleges whether or not it concerns schools which graduate men engaged under them. Even more doubtful is it whether or not the profession as a whole as represented by the American Veterinary Medical Association ought to shirk the responsibility which is really the profession's problem and not the question of one or two branches of our government. It is a shame and disgrace that the profession itself does not have the courage to provide the necessary educational requirements but that we must be constantly compelled by government regulation to provide even a low standard. It is a plain issue not difficult to understand by those who care to study it carefully, and it should be faced squarely. Your committee recommends that this association most heartily endorse the amendment offered by Dean A. L. Klein at the Kansas City meeting, which is as follows:

"Beginning with the collegiate year of 1918-19, the matriculation requirements of an approved veterinary college shall be not less than one year of high school work or equivalent studies taken in other preparatory schools. Beginning with the collegiate year of 1919-20 said requirements shall be not less than two years of high school work or equivalent studies taken in other preparatory schools. Beginning with the collegiate year of 1920-21 the matriculation requirements shall be not less than four years of high school work or equivalent studies taken in other preparatory schools. Provided, that candidates for ad-

mission to approved veterinary schools who cannot present a satisfactory certificate from the proper official of the school or schools attended covering the required amount of preparatory work may be admitted upon passing satisfactory examinations in subjects included in the corresponding years of a high school course. Certificates must show in detail, and by school years, the subjects studied, the number of hours and the number of weeks devoted to each, and the grade obtained in each; said certificates to be available for examination by the committee on intelligence and education of this association. And, provided further, that no student shall be admitted to advanced standing except upon the presentation of a certificate of honorable dismissal from the proper official of the school previously attended and a certificate from the same official showing in detail the studies completed, and, in such cases, credit shall be allowed only for equivalent studies in which the candidate has obtained a passing grade; all other studies shall be taken over. And, be it further provided, that no credit shall be allowed for studies taken in veterinary schools which are not approved by this association. All certificates shall be available for examination by the committee on intelligence and education of this association."

C. H. STANGE, for Committee.

REPORT OF THE COMMITTEE ON METHODS OF TEACHING PHARMACOLOGY AND THERAPEUTICS.

Object.—With the exception of some purely scientific and interesting work for the physiologists, the only reason for teaching or studying the subjects of pharmacology and therapeutics is in their application to the treatment of disease. Your committee believes, therefore, that the instruction in these subjects should be made as practical as possible. It is quite generally conceded that the study of pharmacology is about as uninteresting as any in the veterinary curriculum. Interest can be kept up to some extent by a fairly close application of the principles of the use of the various agents in the treatment of sick animals.

We have considered the subject of pharmacology in the broad sense to include both Materia Medica and Pharmacology proper and will therefore discuss materia medica, including pharmacy, pharmacology and therapeutics.

Materia Medica and Pharmacy. These subjects can be best taught in the laboratory, as it is impossible to become familiar

with them in any other way. The course should include the principles of manufacture and actual manufacture of one or more preparations from each pharmaceutical group; exercises showing solubility and incompatibility of the more important groups, together with a study of the physical characteristics of the more easily recognized drugs. The following deserve a little further attention.

Solubility. The general solubility of the more important drugs should be tested in the laboratory. We realize that it is impossible to learn or remember more than a relative solubility—that is, whether a drug is soluble in water, alcohol, glycerin, etc., and whether freely or but slightly soluble. As a rule, this is all that is desired or should be expected and is sufficient for ordinary work. Solubility is useful to a veterinarian only so far as compatibility is concerned and is important only in prescribing and dispensing drugs. On this account the commonly used drugs should be carefuly studied and but little stress placed upon those which are seldom employed.

Incompatibility. Incompatibility is a subject usually considered very difficult to learn, but for working purposes is not so hard. Chemical incompatibility is the one which gives the most concern. We realize that there are almost any number of agents chemically incompatible with each other, yet with the present tendency to combine but few drugs in a prescription, there are few which are likely to be met with in actual work. The subject can be very effectively taught by a few exercises on the different groups of drugs, showing the most common incompatibilities, as acids and alkalies, tannic acid and metallic salts, silver nitrate, reducing agents, alkaloids, etc. These exercises may be supplemented by class work, pointing out that the application of chemistry is much to be preferred to the individual incompatibles for each drug.

Materia Medica. Under this head will be included characteristics and doses. It is obvious that nearly the entire subject of materia medica should be taught in the laboratory.

Characteristics. Students should have an opportunity to see, handle, make tests of solubility and incompatibility and prepare concise notes on the physical characteristics of the different drugs. While we realize that it is impossible to detect many drugs by their physical characteristics, nevertheless, the fact that students can see and handle them enables them to become more or less familiar with each and to be able to identify some of the more

common drugs with pronounced characteristics. The actual tests for purity and identity are of great importance to the pharmacist but not to the veterinarian.

Doses. Doses is a subject of much controversy. Some authorities advocate rather large ones and others fairly small. While an exact dose would be ideal, we know that there is no such thing and that average doses or safe doses should be accepted, with the idea of impressing upon the minds of the students that it is necessary to give to dose effect or until the desired action is produced. No one can tell the exact dose of drugs. Conditions vary greatly and the desired action is so different that only experience gained in actual practice will determine the doses required.

PHARMACOLOGY PROPER. This in a restricted sense means the action of drugs. It is very important because a practitioner should know not only that a drug does so and so, but also how it produces this action. Laboratory work with experiments upon animals we believe the ideal way of teaching this subject. We believe, further, that seeing the action of a drug most vividly impresses its action upon the minds of the students and shows what may be expected from average doses. In this way, antidotes, both chemical and physiological, may be demonstrated.

While purely experimental work in pharmacology requires a good knowledge of physiology and considerable surgical ability as prerequisites, the most important action of many groups of drugs may be demonstrated without killing the animal and with little or no apparatus; as the rapid purgatives, eserine, arecoline, etc., drugs acting upon the eye, upon the nervous system, digestive system, the belladonna group, etc. On the other hand, those experiments demonstrating action upon blood pressure usually require considerable apparatus and result in the death of the animal. Yet these experiments may be worked as demonstrations and will prove well worth while.

The laboratory work should be supplemented with class work either in the form of lectures or recitations to bring out details which cannot be brought out in the laboratory and at the same time to couple up the action of the various agents with their use in the treatment of disease. So far as possible, the laboratory work in both materia medica and pharmacology should be correlated with the matter gone over in class.

The pharmacology of a drug should include the pharmaceutic preparations—that is, the forms in which it may be procured, doses, methods of administration, its action upon the

different systems of the body, its most important action, how the action is produced, any untoward or side actions, toxicology, including symptoms, diagnosis and treatment and the uses. Stress should be placed upon the more important groups and the more important members of each group and their method of action in the treatment of disease. This greatly aids in teaching the subject and in keeping the interest of the students because they will see the importance of the action, as well as the use. Furthermore, they will never be able to use medicines to the best advantage without knowing their action. One must know the finer details of action because there are so many factors which must be taken into consideration in prescribing in different conditions.

THERAPEUTICS. Therapeutics may be defined as that subject which treats of the cure or alleviation of disease. It is the subject with which we are vitally concerned because without therapeutics there would be little or no use for any kind of medicine. Furthermore, there would be but little work for veterinarians if their work stopped with diagnosis and prognosis.

Therapeutics may be taught and should be taught in three places, each almost as important as the other. They are by class work in the principles involved in connection with pharmacology or separate, in the subject of medicine and in the various clinics.

Class Work in Therapeutics. With the exception of the underlying principles of treatment, it is impossible to deal in more than a general way with the subject of therapeutics in class work. Students should be instructed in the principles of therapeutics—i. e., what is desired in certain conditions, how drugs or other means act in various pathological conditions and why we need a certain line of treatment in these cases—rather than to be taught to use a few drugs for certain diseases. In other words, it should be impressed upon the minds of the students to use rational therapeutics or treat the pathological conditions as manifested in each case, instead of relying upon empirical treatment. We should also discourage the use of pet prescriptions for this and that, but encourage treatment of each case individually. This is not so difficult as it seems because we assume that a student will know or understand physiology and pathology and then if he knows pharmacology and the principles involved it is not difficult to prescribe intelligently. Taking the case of a disease like eczema, for an example, it is not enough to have

several prescriptions to use in this disease, but it should be pointed out that the treatment must vary with the pathological changes encountered, whether moist or dry, acute or chronic, etc., since what will prove of excellent value in one case may be detrimental in another.

Prescription Writing. Your committee believes that considerable practice should be given to prescription writing. Practice in this work gives an opportunity to make different combinations for various conditions. It will also aid in forming the habit of thinking a prescription when dispensing medicine instead of placing several ingredients in a bottle or paper and telling the owner to give a certain amount without knowing what each dose will be. If the instructor will not criticise too severely much profit can be gained from this work. Emphasis should be made that in the present light of medicine there is no place for the old shotgun or blunderbuss prescription, but that this has been replaced by one of few drugs upon which dependence can be put for doing what is desired. Any prescriptions given should be presented with the idea that they are only representative and only show the various ways in which drugs may be combined.

Medicine. Therapeutics should be thoroughly considered in the study of medicine. In this subject the various diseases are discussed, including symptoms, diagnosis and treatment. As a usual thing, the diagnosis and symptoms are thoroughly discussed and but a small amount of attention given the treatment. Treatment should, however, be as carefully discussed as the other two. One teaching medicine should not be content with mentioning certain agents in the treatment of a disease, but should explain why they may be used and what results may be expected from their use.

Clinics. The various clinics are the only places in which applied therapeutics may be taught. They may be likened to the so-called bedside therapeutics in human medicine. Patients are brought to clinic for treatment. They offer opportunity for instruction in examination, diagnosis, prognosis and treatment, and the last is of most importance to the owner. The clinics are the only places in which we can couple up the various pathological conditions with actual treatment instead of basing therapeutics on supposition and theory, as must be done in the class room study of therapeutics or medicine.

SUMMARY.

1. Materia Medica and Pharmacy should be largely taught in the laboratory.

2. Pharmacology should be taught in both laboratory and class room. The greater amount of instruction in the laboratory the better.

3. Therapeutics can only be superficially taught in the class room and should therefore be rounded out in the study of medicine and in the clinics, the latter of which may be compared to laboratory work where the students are able to observe the results from the use of various therapeutic measures.

H. J. MILKS.

DOMINION VETERINARY MEAT INSPECTORS' ASSOCIATION OF CANADA.

On March 15 the D. V. M. I. A. of Canada met in the Ontario Veterinary College to hear Dr. Geo. Hilton of Ottawa give an address on "The Work of the Veterinarian in the Field." He described all the contagious diseases and told how they were handled according to regulations. He also showed a number of lantern slides on the work. It was all instructive and much enjoyed by all.

Dr. Fowler of Toronto was next called and gave us an address on his new treatment of tetanus. He treats with the serum and makes the injection into the spinal cord direct, between the lumbar and sacral vertebræ. This treatment has been very successful, as he has lost only one case out of twenty-eight. This was very interesting to all, as it was something new.

Dr. McGilvray was next called and gave a few remarks.

Moved by Dr. Torrie, seconded by Dr. Weaver, that a hearty vote of thanks be tendered the speakers. Carried.

On March 22 the association met for general business and election of officers. Minutes of last meeting read and adopted.

Communications were then read. First from Edmonton branch, asking us to request the department at Ottawa to assist them in installing a library there. It was decided that it would be best for them to communicate direct first before asking our assistance. The secretary was instructed to inform them of the decision.

Second, from Dr. Barnes, saying that he would attend the civil service convention in our interest.

Third, address from our president, Dr. D. R. Bone of Edmonton, was read. This was a very interesting and helpful address and showed that he had spent a lot of time and thought on it. It was received with applause and a clap of hands. Moved by Dr. Irvine, seconded by Dr. D. C. Tennent, that the secretary write an appreciation of his endeavors in preparing this splendid address.

Fourth, a motion from the Edmonton branch that this address be sent to every member. Some of the suggestions in this address were discussed, especially the publishing of a paper in connection with our work. It was decided to send the minutes of each meeting to the American Veterinary Medical Association Journal.

Applications from eleven new members were read. Moved by Dr. Weaver, seconded by Dr. Fisher, that applicants be accepted. Carried.

Moved by Dr. Irvine, seconded by Dr. Thompson, that all branches of our organization pay their per capita tax to our association and we to pay the total to the Civil Service Federation. Carried.

After a lot of discussion on the salary of the secretary, it was moved by Dr. Weaver, seconded by Dr. Wingate, that the position of secretary be honorary. This was defeated.

Some complaints were heard about the meetings being held on Saturday night and it was left for the executive to try out a meeting on a Wednesday night.

Dr. Cook then named Drs. Tanner and Maxwell as scrutineers for the elections, with the following results:

President—Dr. R. H. Cook.

Vice President—Dr. D. C. Tennent.

Secretary-Treasurer—Dr. Wm. Tennant.

Executive Committee—Dr. R. J. Thompson, Dr. A. G. Murray, Dr. E. L. Frechette.

WM. TENNANT,
Secretary-Treasurer.

RETIRING PRESIDENT'S ADDRESS.

In most organizations such as ours the office of president is generally only an honorary one, but our constitution has imposed upon the occupant of that office certain duties, which I have endeavored to fulfill to the best of my ability. Whether or not I have succeeded I leave to your good judgment.

As you are aware, early in the year our department transferred me from Toronto to Edmonton and our worthy vice presi-

dent, D. R. H. Cook, has filled the president's chair at Toronto meetings in a very able manner.

I wish to thank each one of you for the very great honor you have reposed in me in electing me for four succeeding years to the most honorable position in your association. To fail to mention the names of those who have held office with me during my term as president would be to fail in my duty entirely, and prove myself ingrate or wholly devoid of appreciation; therefore, I especially wish to thank Dr. Cook; Dr. Fisher, who stayed at the helm through more than one stormy session; Dr. Tennant, who later assumed the office of secretary, and the various members of the executive committee for their unselfish and whole-hearted support which has been so effective in building upon a sound and lasting foundation the Dominion Veterinary Meat Inspectors' Association. To these gentlemen I wish to express my thanks for being instrumental in bringing to a satisfactory completion various questions which it has been the object of our association to attain.

To the officers whom you are about to elect for the coming year let each one of us give the most loyal support. As your retiring president I would also solicit your most loyal support to the Canadian Meat Inspection Service, ever conscious of our duties and responsibilities towards the service, which, to say the least, we are proud of.

In the minutes of your December meeting at Toronto I note a call for suggestions for ways and means of inducing a number of members to attend the regular meetings of the association. Why, let me ask, should we be forced to look for some inducement in the form of entertainment? After what our association has done, and is doing, to improve conditions in the service, the inspector who continually absents himself from the meetings is not fair to himself. Honest membership makes an inspector a better man and more efficient; the spirit of unity brought about by membership in our organization makes for harmony at a plant and results in better performance of duty. Our departmental heads must also realize that there is something radically wrong with a man who cannot attend the meetings in so just a cause as the association is engaged in, that such a one in shirking his duty towards the association is capable of shirking his duty towards the department's service also.

With reference to enlarging the attendance at meetings, as also increasing membership in the association, let me suggest the

need of an official organ in the form of a bulletin or journal issued by the D. V. M. I. A. It seems imperative that some system be inaugurated whereby complete news of what is being done within the association may be disseminated and thus bring into more intimate touch the members who I am glad to say are now located in every province of our Dominion. Such a system would also be of service in stimulating the social nature of our activities and I would suggest that this be regarded as a stepping-stone towards greater development of the organization. I would recommend that the incoming officers give this matter their early consideration.

In regard to organization in the West, I may say our appeal for membership in Western Canada has already met with a hearty response which is encouraging. With the exception of one inspector, whom we expect to have on our membership roll in the near future, all veterinary inspectors in Vancouver, Edmonton, Calgary and Prince Albert are members of the Dominion Veterinary Meat Inspectors' Association. A good, active branch association has been formed in Edmonton, at which papers are read every two weeks. These papers are of a high calibre, instructive and interesting, and the fact that all members are regular attendants and each one enters into the discussion speaks well for the Edmonton branch of the D. V. M. I. A., as also the Canadian Meat Inspection System. A feeling seems to have gone abroad in Winnipeg that if the inspectors there did become members of the association their voices would not be heard in the conduct of the organization. I believe that it is on this account that our appeal for membership from Winnipeg has met with little response. Let me assure any who may in this manner misunderstand the objects of the D. V. M. I. A. that the organization is composed of veterinarians appointed under the meat and canned foods act in all and every locality in the Dominion and that each member already has and will continue to have a say in the workings of the association. It is our desire that every veterinary meat inspector in Canada become a member of the association. No man can live to himself; let us coöperate; the greatest good to the greatest number.

"Community of interests" is the dominant note in the tune to which the industrial and business world, in common with our allied armies, are marching today. It is the realization of this fact which has resulted in that splendid coördination of allied power and resources which is, perhaps, the most striking feature

of the present world struggle. Success in any line of endeavor is admittedly largely a question of organization and to organization we must look for the realization of our hopes in the future. The objects of the Dominion Veterinary Meat Inspectors' Association officially stated are: To unite fraternally all veterinary meat inspectors employed by the Department of Agriculture; to secure by discussion of topics pertaining to meat inspection a uniform interpretation of the departmental rules and regulations and thus promote efficiency of the service; to secure through cooperation with the Department of Agriculture more equitable salary rates and regulation of hours of labor; to obtain for its members full benefits of all laws existing and which may be hereafter enacted, and by upholding all civil laws. Wherever in the lives of men conditions obtain which require remedial action, experience shows that somehow, at some time, an attempt will be made to rectify and adjust. The D. V. M. I. A. has made and will continue to make that attempt and, while not at all times acquiring our objective, yet not without a measure of success, which is indeed gratifying. While, unfortunately, the meat inspector does not enjoy a seven to eight hour a day service, as most other occupations, and while the work of an inspector is dangerous in that he is so continuously exposed to infection from diseased portions, together with conditions under which post-mortem work is performed, at times somewhat disagreeable, still in a happier day that is not too far distant we hope to see a wider interest manifested in developing conditions which will be more becoming professional servants. Since its inception our association has seen a marked improvement in the condition of employment amongst inspectors. For this it can justly claim a great deal of credit. Looking back over the past four years, we note that pay for overtime has been accomplished, minimum salary advanced from twelve to fourteen hundred dollars per annum, the maximum salary from eighteen hundred to two thousand. It is to the credit of the association that I announce these changes which I am pleased to say have been brought about by coöperation with the Department of Agriculture.

If the D. V. M. I. A. was to be judged by what it has done in the betterment of financial conditions that alone would justify its existence. In order to maintain the efficiency of our government meat inspection system, it is necessary that the salary and working conditions for the professional men approach a standard somewhat commensurate with the opportunities for

veterinarians in other fields of endeavor. In this connection it is gratifying to know that the Civil Service Commission has at present under consideration a professional class of salaries, as well as an improvement in conditions. Our interests at Ottawa are being represented by our honorable vice president, and I am sure I voice the sentiments of every veterinary meat inspector, whether a member of this association or not, when I say we trust his efforts may be highly successful and for that end we will ever pray.

I would not consider this address complete without making reference to the death of Dr. John Webster Smith, which occurred in Edmonton, in October of last year. Dr. Smith, whose home was in Newmarket, Ontario, was deeply interested in the success of the association, a promising member, and, although only a short time with us, he earned the respect of all who were fortunate to come in contact with him. It is with profound regret that I announce his early demise, which was a shock to all who knew him. At the time of writing this address news has come to me of the death of Mrs. George A. Nichol, wife of one of our members. Dr. Nichol has for some time been stationed in Calgary, but later was transferred to Edmonton. On behalf of the association I wish to extend to Dr. Nichol our heartfelt sympathy with him in this sad bereavement.

In conclusion, let me say that during the four years of the presidency I have seen many ups and downs in the association. My decisions, which perhaps have not at all times concurred with those of the majority, have, I assure you, been formulated conscientiously and with the best motives in view, and the addresses which you have received from time to time have carried with them the interests of the association first and at all times. I would ask you gentlemen to accept my resignation as an office-holder in your organization and to the officers to be elected for the ensuing year I wish to extend my good wishes for a most successful term; I would pledge to them my continued loyalty to my unabated interest in the advancement, growth and development of the Dominion Veterinary Meat Inspectors' Association of Canada.

Gentlemen, I thank you. D. R. BONE.

Dr. W. N. Gaston has received his discharge from the army after having been stationed at Fort Riley, Kansas, and Camp Lee, Virginia, and is now located at Seneca, Kansas.

NECROLOGICAL.

DR. CHAS. A. WALDRON.

Dr. C. A. Waldron, Tecumseh, Michigan, died recently rather suddenly as the result of nephritis. The Doctor was one of the oldest practitioners in the State of Michigan. Formerly he was a member of the State Examining Board and of the Michigan State Association.

DR. WILLIAM H. SERIGHT.

The Journal has just received notice of the death of Dr. Wm. H. Seright of Atlanta, Georgia. Full details have not reached the office, but we understand Dr. Seright was born at Pleasanton, Kansas, in 1879. His education was begun in a common school and continued in the Kansas State Normal School. He was graduated from the Kansas City Veterinary College in 1910 and joined the A. V. M. A. in 1917.

DR. JOSEPH T. NATTRESS.

Dr. Joseph T. Nattress, one of the most prominent practitioners in the state of Illinois, died at his home at Delavan on March 19.

Dr. Nattress was a graduate of the Ontario Veterinary College in the year 1885 and joined the American Veterinary Medical Association in 1904.

Dr. Nattress has taken a very active part in all matters pertaining to veterinary progress in the state of Illinois, and was one of the most influential veterinarians in that state. He was a man of sterling integrity, took a decided stand on every question for veterinary advancement. Dr. Nattress was planning to attend the next A. V. M. A. meeting in New Orleans with his wife. His death will be a great loss to the profession, not only in Illinois, but the nation.

DR. W. C. KRAEMER.

Dr. W. C. Kraemer, a lieutenant in the 307th Field Artillery, died recently, in France, of pneumonia. Dr. Kraemer was a graduate of the Veterinary Department of the University of

Pennsylvania in the year 1916 and joined the A. V. M. A. the same year. Dr. Kraemer was associated with Dr. E. P. Althouse of Sunbury, Pennsylvania, before he entered the army service.

WILLIAM RANSDELL GOODWIN.

William R. Goodwin, former vice president of the Sanders Publishing Company and managing editor of The Breeder's Gazette, Chicago, died on April 5 at his country home, Oakhurst, near Naperville, Illinois, in his fifty-sixth year.

Mr. Goodwin was born at Brookville, Franklin County, Indiana, August 19, 1863, and was the son of the late Rev. Dr. William R. Goodwin, of the Methodist denomination, who was president of a college at that place.

Mr. Goodwin was educated in the public schools of Quincy, Danville and Decatur, Illinois, and early matriculated at Illinois Wesleyan University, Normal, Illinois, where he studied for three years. He completed his college course at the DePauw University, Greencastle, Indiana, in 1883, receiving his B. A. degree. In 1886 his Alma Mater conferred upon him the advanced degree of Master of Arts.

At the time of his death, Mr. Goodwin had been associated with The Breeder's Gazette for something like thirty-four years, and all who have been readers of that splendid journal can testify to the magnificent work performed by the late managing editor in the upbuilding of the live stock interests of the country through his wonderful store of information along these lines, and his facile pen.

Mr. Goodwin was a true friend to the veterinary profession, and always anxious for its advancement along progressive and scientific lines to meet the ever-increasing needs of our advancing live stock industry. Just previous to the annual meetings of the A. V. M. A. it was his frequent custom to remind the writer to send him a report of the proceedings to be published in the Gazette, which evidenced the interest he always manifested in the profession. It would be utterly impossible, in a short obituary notice, to do justice to the work and accomplishments of this able and good man, who will be missed from ocean to ocean, as well as abroad; in fact, wherever the Gazette is read, and that means the world over, where progressive live stock husbandry obtains.

The deceased was buried, April 8, in the village cemetery within sight of his former stately Oakhurst home, where hundreds of his friends and associates gathered to pay their last tribute of

respect; and, to quote from the story of his life in the Gazette, to which he devoted the greater part of it: "No massive stone yet marks the place, but in the hearts and minds of thousands of American farmers and stock breeders" (and, we might add, veterinarians) "there is already a monument more imperishable than granite to his memory."

Mr. Goodwin leaves a widow and one son, who is at present a student at the University of Chicago. W. H. D.

REVIEWS.

REPORT OF NEW YORK STATE VETERINARY COLLEGE, CORNELL UNIVERSITY.

This is the usual annual report and it summarizes the year's work. In the medical and ambulatory clinic 3,210 cases were handled, 718 in the consulting and surgical clinic, and 393 in the small animal clinic. A few unusual cases are described in detail.

The diagnosis department made 1,337 examinations. Classified and named in the order of preponderance of numbers, the cases examined include poultry diseases, rabies, tumors, glanders, anthrax, actinomycosis, parasites, blackleg, tuberculosis, hemorrhagic septicemia, blackhead, and Johne's disease.

During the year the college sent out 72,007 doses of tuberculin, 15,435 doses of anthrax vaccine, 15,374 doses of hog cholera serum, and 6,087 doses of mallein.

Researches on the Diseases of Breeding Cattle, by W. L. Williams and C. M. Carpenter, describes additional investigations conducted during the year, and correlates these with past work. Valuable data are submitted and a thoughtful and interesting interpretation is made. Whether or not the reader finds himself able to follow the authors from the data submitted to the conclusions reached, the article furnishes abundant food for thought.

Handling an Outbreak of Calf Scours and Pneumonia, by C. M. Carpenter, is a paper of special interest and value to practitioners in dairy districts. It describes the general hygienic measures adopted, mentions the indications for the use of serums and bacterins, and gives in detail the results obtained in handling a large and badly infected herd. It also records a bacteriological study of individual cases.

The Paranasal and Facial Sinuses of the Sheep, by G. S. Hopkins, Department of Anatomy, gives brief and accurate descriptions and excellent illustrations. Likewise an article by E. Sunderville, also of the Department of Anatomy, on the digestive anatomy of the sheep, is especially adaptable to the need of the times.

Certain Aspects of the Pathology of Spavin, by S. A. Goldberg, Department of Pathology and Bacteriology, deals briefly with rather extensive researches relative to the origin, nature, and development of joint lesions. It is a valuable contribution to the literature on this subject. Foreign Bodies in the Tissues with a Report of Six Cases is an additional paper by the same author.

A Preliminary Report on the Urine Analysis of the Dairy Cow, by C. E. Hayden, Department of Physiology, reviews past work, describes methods, and suggests a tentative standard for normal urine, based on the examination of fifty samples. Orokinase and Salivary Digestion in the Horse, Cow, and Pig, by B. J. Finkelstein, of the same department, describes researches that clear up some doubtful points relative to salivary digestion.

Horseshoes of Interest to Veterinarians is a paper by Henry Asmus, Department of Horseshoeing. This illustrates and mentions briefly the use of 151 types of shoes designed to correct various faults of conformation and gait. Some of the shoes were designed by the author.

The Strongylidæ Affecting the Horse, by W. A. Hagan, Department of Pathology and Bacteriology, gives a general classification of the entire family (Strongylidæ), together with a more detailed study of the life history and appearance of the species that infest the horse and inflict damage. The author refers to a rather common error in describing aneurisms in the mesenteric arteries to invasions of *Strongylus equinus*. *S. vulgaris* is stated to be the real offender. R. R. Birch.

PUBLICATIONS RECEIVED.

Report of the Dean of the New York State Veterinary College, New York University, for 1917-1918.

Report of the New York State Veterinary College at Cornell University, for 1917-1918.

The Veterinary Alumni Quarterly of the Alumni Association, College of Veterinary Medicine, Ohio State University, Columbus, March, 1919.

Philippine Journal of Science, Section B, Tropical Medicine, November, 1918.

Recueil de Médecine Vétérinaire (Alfort).

Revue Generale de Médecine Vétérinaire (Toulouse).

American Journal of Clinical Medicine (Chicago).

Veterinary Record (London).

Veterinary News (London).

Veterinary Journal (London).

Revista de la Sociedad de Medicina Veterinaria (Buenos Aires).

La Clinica Veterinaria (Milan).

MISCELLANEOUS.

OKLAHOMA NOTES.

Dr. C. R. Osborn, who has been located at Chickasha doing hog cholera control work for the last year, has been transferred to Sioux City, Iowa.

Dr. W. P. Shuler has been appointed as a deputy state veterinarian and will give his time to tuberculosis control work under the recently enacted law. The Doctor took unto himself a wife in the person of Miss Catherine Linning on March 26. It is expected that they will continue to reside in Oklahoma City.

Dr. J. P. O'Connor, Inspector in Charge of Hog Cholera Control, is spending his vacation at Vinita.

Dr. Arthur W. Deem has been honorably discharged from the Veterinary Corps and has located at Fairview.

Several owners of hogs are bringing suits against various serum producers for damages alleged to have resulted from the administration of anti-hog-cholera serum.

We are finding very little of the old-fashioned kind of hog cholera, but there is plenty of what appears to be swine plague or "mixed infection."

Dr. Evard A. Dean, recently connected with the army meat inspection service, is now attached to the meat inspection force at Oklahoma City. He has been suffering from a severe attack of influenza. J. S. GROVE, Resident State Secretary.

(Won't other Resident State Secretaries emulate Dr. Grove's example and furnish the Journal interesting news notes?—Ed.)

Captain Robert Porteus has received his discharge from the army and is now located at West Lafayette, Ohio.

Dr. Ben Howes, for more than twenty years a veterinary inspector in the Bureau of Animal Industry, has resigned to engage in farming in Orleans County, New York. The vacancy caused by his resignation has been filled by the detail of Dr. Samuel W. Schuppan of Buffalo, New York, to Beesher Falls, Vermont, where he will supervise the inspection and quarantine of animals imported from Canada into the United States.

Seizures have been effected on the following products: Anti-Choleric Hog Remedy; American Hog Remedy; Snoddy Hog Cholera Remedy; Swine-Lixir; Cal-Sino Hog Restoratitve; National Hog Remedy; S. H. Hog Remedy; AHRA Hog Health Company; B. A. Thomas Improved Hog Powder. These preparations are labeled in such manner as to convey ingredients which could not produce the effects claimed by the manufacturer.

The Journal is in receipt of the drawings and specifications of a choke-removing appliance patented by Dr. O. G. Beck, Remount Department 319, Louisville, Kentucky. The Doctor informs us he will be glad to attempt to answer any questions concerning this new patent of his, as he believes it will be of benefit to the profession.

Dr. U. G. Houck has been appointed Chief of the Division of Hog Cholera Control in the United States Bureau of Animal Industry to fill the vacancy created through the resignation of Dr. O. B. Hess, who resigned to accept a position with the Fort Dodge Serum Company at Fort Dodge, Iowa. Dr. Houck has served in various important capacities during the twenty-two years he has been connected with the Bureau. It was he who inaugurated the hog cholera control work that has been conducted in coöperation with the various states since 1913. When foot and mouth disease broke out in this country in 1914 he was relieved of the position to assume charge of that campaign in the field on account of his previous experience with that disease.

Examinations for registration in veterinary medicine for the commonwealth of Massachusetts will be held at the state house, Boston, Massachusetts, on June 25 and 26. Application blanks may be had of the secretary, Dr. E. W. Babson, Gloucester, Massachusetts.

E. W. BABSON, Secretary.

The Wisconsin Board of Veterinary Examiners will give an examination at the Capitol Building, Madison, Wisconsin, June 3 and 4, commencing at 9 a. m., June 3, 1919.

T. H. FERGUSON, Secretary.

VETERINARY MEDICAL ASSOCIATION MEETINGS

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y
Alabama Vet. Med. Ass'n		Birmingham	C. A. Cary, Auburn
Alumni Ass'n College of Vet. Med. O. S. U.		Columbus	W. R. Hobbs, care O. S. U., Columbus, Ohio
Alumni Ass'n N. Y.-A. V. C.		338 E. 26th St.	Jos. A. DeGroodt, Mendham, N. J.
Alumni Ass'n U. S. Coll. Vet. Surgeons		Wash., D. C.	Week beginning Nov. 17
American V. M. Ass'n	Nov. 17-21, 1919.	New Orleans	N. S. Mayo. 4753 Ravenswood Ave., Chicago
Arkansas Veterinary Ass'n			R. M. Gow, Little Rock
B. A. I. Vet. Ass'n of Iowa		Ames, Ia.	F. Jelen, Cedar Rapids, Ia.
B. A. I. Vet. In. A., S. Omaha	3d Mon. each mo.	S Omaha, Neb.	J. V. Giffee, So. Side, Omaha
British Columbia Vet. Ass'n			K. Chester New Westminister, B C.
California State V. M Ass'n	June 11, 1919		Geo. H. Hart, Berkeley
Central Canada V. Ass'n			A. B. Wickware, Ottawa
Central N. Y. Vet. Med. Ass'n	June and Nov.	Syracuse	W. B. Switzer, Oswego
Chicago Vet. Society	2d Tu. each mo.	Chicago	A. A. Leibold, Chicago
Colorado State V. M. Ass'n	June 5 and 6	Fort Collins	I E. Newsom, Ft. Collins
Conestoga Veterinary Club	2d Thu. each mo.	Lancaster, Pa.	H. B. Brady, Sec'y
Connecticut V. M. Ass'n			A. T. Gilyard, Waterbury
Dominion Vet. Meat Inspectors' Ass'n of Canada	3d Sat each mo.	Toronto	Wm. Tennant, Toronto
Genesee Valley V. M. Ass'n		Rochester	J. H. Taylor, Henrietta, N. Y
Georgia State V. M. A.			P. F. Bahnsen, Americus
Hudson Valley V. M. A.			W. H. Kelly, Albany
Idaho Ass'n Vet. graduates			C. V. Williams, Blackfoot
Illmo Vet. Med. Ass'n			L. B. Michael, Collinsville, Ill.
Illinois State V. M. Ass'n			L. A. Merillat, Chicago
Indiana Veterinary Ass'n			G. H. Roberts, Indianapolis
Iowa Veterinary Ass'n		Ames	H. D. Bergman. Ames
Kansas State V. M. Ass'n			J. H. Burt, Manhattan
Kentucky V. M. Ass'n	July 10, 11	Shelbyville	D. E. Westmoreland, Owensboro
Keystone V. M. Ass'n	2d Tu. each mo.	Philadelphia	E. S. Rockwell
Louisiana State V. M. Ass'n			E. I. Smith, Baton Rouge
Maine Vet. Med. Ass'n		Portland	E. E. Russell, Farmington
Massachusetts Vet. Ass'n	Monthly	Quincy House Boston	
Michigan State V. M. Ass'n			W. A. Ewalt, Mt. Clemens
Minnesota State V. M. Ass'n	July 9-10	Brainerd	C. P. Fitch, St. Paul
Mississippi State V. M. Ass'n			J. A. Barger, Jackson
Missouri Valley V. Ass'n		Kansas City, Mo.	R. F. Bourne, Ft. Collins, Col.
Missouri Vet. Med. Ass'n			Chas. D. Folse. Kansas City
Montana State V. M. A	June 25-27	Butte	A. D. Knowles, Missoula
Nat'l Ass'n B.A.I.Veterinarians	Meet with A. V. M A.		S. J. Walkley, 185 N. W Ave. Milwaukee, Wis.
Neb. Vet. Med. Ass'n			S. W. Alfort, Lincoln
Nevada State Vet. Association		Reno	W. B. Earl, Reno, Nev.
New York S. V. M. Society	July 24-25	Brooklyn	C E. Hayden, Ithaca
North Carolina V. M. Ass'n			J P. Spoon, Burlington
North Dakota V. M. Ass'n			W. J. Mulroony, Havana
North-Western Ohio V. M. A.			C. E. Hershey, Tiffin, O.
Ohio State V. M. Ass'n			R. I. Bernath, Wauseon
Ohio Tri-County Vet. Ass'n			Dr. W. R. Lukens, Hillsboro
Ohio Valley Vet. Med. Ass'n			C. S. Henry, Terre Haute
Oklahoma State V. M. Ass'n	July 7, 8, '19	Oklahoma City	D. W. Gerber, Okla. City, Ok.
Oregon Vet. Med. Ass'n			B. T. Simms, Corvallis, Ore.
Pennsylvania State V. M. A.		Harrisburg	D. E. Hickman, Phila., Pa.
Portland Vet. Med. Ass'n	4h Tu. each mo.	Portland, Ore.	Sam. B. Foster, Portland, Ore
S. Carolina Ass'n of Veter'ns	Sept. 4, 5	Columbia, S. C.	B. K. McInnes, Charleston
Schuylkill Valley V. M. A.		Reading	C. R. Potteiger, Reading
South Dakota V. M. A			S. W. Allen Watertown
So. Aux. of Cal. S V.M Ass'n	3d. Wed. Dec., Mar., June. Sept.	Los Angeles	J. A. Dell. Los Angeles
Southeastern Michigan V. M. Ass'n	2nd Wednesday Jan., Apr., Jul. Oct.		H. Preston Hoskins, Detroit
Southeastern States Vet. Med. Ass'n		Birmingham, Ala.	H. C. Hutchens, Atlanta, Ga.
Southern Tier V. M. A.	July 5	Binghamton	R. R. Birch, Ithaca, N. Y.
Southwestern Mich. Vet. Med. Ass'n			L. A. Winter, Eau Claire Mich.